**National Advisory Council for Environmental Policy and Technology**

July 30, 2007

Administrator Stephen L. Johnson
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

***Re: Sustainable Water Infrastructure Recommendations***

Dear Administrator Johnson:

On behalf of the National Advisory Council for Environmental Policy and Technology, I am pleased to forward our initial findings and recommendations on EPA's Sustainable Infrastructure Watershed Pillar. NACEPT endorses the recommendations in this report, which our sustainable water infrastructure workgroup developed.

EPA asked the Council to identify ways the Agency can better advance sustainable approaches to water resource management and infrastructure to meet watershed goals. The nation faces a critical challenge in sustaining and expanding our water supply and our water and wastewater infrastructure to continue to enjoy the benefits of safe, clean, plentiful water. One element EPA is using to address this problem is the watershed approach.

We have concluded that, in general, neither policymakers nor the public have a clear understanding of: (1) the concept of a watershed approach to water management, (2) the relationship between a watershed approach and the urgent need to address water supply, water quality, and insufficient or deteriorating water infrastructure, or (3) the benefits of a watershed approach. Although a few excellent examples demonstrate application of these principles and concepts, those examples are isolated, are not comprehensive solutions even within that watershed, and are not part of a nationwide movement or state-of-practice.

NACEPT offers a set of recommendations for how EPA can advance wider and more effective use of the watershed approach to sustainable water infrastructure. These recommendations fall into four categories of specific steps EPA should take: (1) lead by example, including organizing within EPA and naming an Agency-wide sustainable watershed coordinator with responsibilities for aligning all pertinent EPA activities and interactions with other federal agencies to help advance watershed principles; (2) educate, communicate, and provide information, including illustrating the urgency of the need to adopt a watershed approach for sustainable water infrastructure; (3) encourage, facilitate, and fund collaboration, including leveraging and participating in other agencies' planning activities; and (4) develop, use, and fund specific tools

employing, for example, EPA's stormwater phase II authority, NPDES permits, state revolving funds, trading, total maximum daily loads, and more.

In addition to the recommendations, this report also describes the background of our processes and work, provides our findings based on our experience and research, and includes various appendices with helpful materials. And in the second phase of our work, to be submitted in 2008, we will endeavor to identify what benefits are already known, ways EPA could further develop this information, and ways EPA can communicate this information to stakeholders.

We appreciate the opportunity to provide these recommendations and hope this report will be helpful to you and the Agency in achieving EPA's mission. Of course, we would be happy to meet with you and others about the recommendations in this report at any time.

Sincerely,

John L. Howard, Jr.
NACEPT Chair

cc: Dan Watts, Chair, NACEPT Sustainable Water Infrastructure Workgroup
Marcus Peacock, Deputy Administrator
Charles Ingebretson, Chief of Staff
Ray Spears, Deputy Chief of Staff
Benjamin Grumbles, Assistant Administrator, Office of Water
Sheila Frace, Director, Municipal Support Division, Office of Wastewater Management, Office of Water
Benita Best Wong, Director, Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds
Rafael DeLeon, Director, Office of Cooperative Environmental Management
Sonia Altieri, NACEPT Designated Federal Officer

# NACEPT's Initial Findings and Recommendations on EPA's Sustainable Infrastructure Watershed Pillar

July 2007

The National Advisory Council for Environmental Policy and Technology (NACEPT) is an independent federal advisory committee that provides recommendations to the Administrator of the U.S. Environmental Protection Agency (EPA) on a broad range of environmental issues. The findings and recommendations of the Council do not necessarily represent the views of EPA.

# Table of Contents

# I. Executive Summary

EPA asked the National Advisory Council on Environmental Policy and Technology (NACEPT) to identify ways the Agency can better advance sustainable approaches to water resource management and infrastructure to meet watershed goals. The nation faces a critical challenge in sustaining and expanding our water supply and our water and wastewater infrastructure to continue to enjoy the benefits of clean and safe water. One element EPA is using to address this problem is the watershed approach.

John Wesley Powell described a watershed as "that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community." A watershed approach thus is a process of including broad stakeholder involvement across the community to coordinate management of all aspects of policy and action affecting the water within hydrologic boundaries.

EPA is working diligently to help communities address this issue. In just the last year, EPA has announced several watershed-based initiatives, resources, and tools, including promotion of green infrastructure to reduce stormwater runoff and hosting a national conference on how to pay for water in the future.

EPA broke our charge into two phases. In the first, EPA asked NACEPT to answer by this summer five specific questions about collaboration, support, and overcoming barriers. In the second phase, to be completed in 2008, NACEPT will consider the question of benefits.

Our initial report contains four main sections: (1) a background of our processes and work, (2) our findings based on our experience and research, (3) our recommendations, and (4) various appendices with helpful materials.

We have concluded that, in general, neither policymakers nor the public have a clear understanding of: (1) the concept of a watershed approach to water management, (2) the relationship between a watershed approach and the urgent need to address water supply, water quality, and insufficient or deteriorating water infrastructure, or (3) the benefits of a watershed approach. Although a few excellent examples demonstrate application of these principles and concepts, those examples are isolated, are not comprehensive solutions even within that watershed, and are not part of a nationwide movement or state-of-practice.

In response, NACEPT offers a host of recommendations for how EPA can advance wider and more effective use of the watershed approach to sustainable water infrastructure. These recommendations fall into four categories of specific steps EPA should take: (1) lead by example, including organizing within EPA and naming an Agency-wide sustainable watershed coordinator with responsibilities for aligning all pertinent EPA activities and interactions with other federal agencies to help advance watershed principles; (2) educate, communicate, and provide information, including illustrating the urgency of the need to adopt a watershed approach for sustainable water infrastructure; (3) encourage, facilitate, and fund collaboration, including leveraging and participating in other agencies' planning activities; and (4) develop, use, and fund

specific tools using, for example, EPA's stormwater phase II authority, NPDES permits, state revolving funds, trading, total maximum daily loads, and more.

As we learned in this first phase, the benefits of a watershed approach are neither well defined nor well known. Community stakeholders will be attracted to a watershed approach only if they see the direct benefit to their organization's mission. In our second phase, we will endeavor to identify what benefits are already known, ways EPA could further develop this information, and ways EPA can communicate this information to stakeholders.

In addition, we focused in this first phase primarily on water infrastructure: the pipes and sewers and treatment plants of drinking water and wastewater. We did not adequately explore – and so we will explore more fully in the second phase – the interrelationship of these issues with the elemental issue of water supply.

# II. Background

EPA has asked the National Advisory Council on Environmental Policy and Technology (NACEPT) to provide assistance to the Agency in advancing cost-effective and sustainable approaches to water resource management and infrastructure to meet watershed goals. The Agency belief is that the watershed approach is critical to protecting and restoring the nation's waters. Furthermore, EPA advocates that full realization of the benefits of the watershed approach will come from integration of the approach into the comprehensive planning processes at the state, regional, and local levels.

One of the most critical challenges facing the Nation is the need to sustain our water and wastewater infrastructure to ensure that the public can continue to enjoy the environmental, health, social, and economic benefits that clean and safe water provide. Our nation's aging water and wastewater systems together with growing and shifting populations will require significant investment for new infrastructure along with maintenance and upgrade of existing facilities. Current approaches and technologies, along with available investment sources, may not be adequate to meet the needs. One component of the EPA approach to addressing this problem is the watershed approach, which is generally understood to mean broad stakeholder involvement, hydrologically defined boundaries (that may cut across political boundaries), and coordinated management across all aspects of policy that affect water. The approach benefits from participation and active involvement of stakeholders at all levels from federal to states and tribes to local government and utilities.

Yet, questions remain about how best to facilitate the use of the watershed approach in creating a sustainable water infrastructure. The Agency wants to focus its resources most effectively in areas such as promoting collaboration among stakeholders, assisting local government in building support for the watershed approach, encouraging grassroots support for implementation of the approach, and identifying barriers that may slow implementation. In addition, the Agency is interested in how best to use information and data from successful uses of the approach that communicate the benefits that can be achieved.

The full charge, and additional background material, from EPA to NACEPT is contained in Appendix 1. In summary, NACEPT was asked to answer five specific questions that involve the issues of collaboration, support, and overcoming barriers with the request that answers be provided in 2007. A second phase of the request asks NACEPT to consider the question of benefits and is to be completed in 2008.

## NACEPT Approach[1]

NACEPT established a Work Group to respond to the charge from the Office of Water. The Work Group held three meetings, in conjunction with NACEPT Council meetings. In addition, several conference calls were held. The Work Group followed two paths to obtain an initial understanding of the current approaches and activities within EPA in the area of use of a watershed approach to sustainable water infrastructure as well as learning about activities and

[1]The intention of these discussions and recommendations is to include Tribal Governments. Any omission of Tribal Governments when referencing State or Local governments is unintentional.

needs of stakeholders who are responsible for addressing the sustainable water infrastructure issues. The Work Group met with representatives of many programs within the Office of Water and other EPA entities to learn about current initiatives and plans. In addition, interviews were held with state, local, and private groups from around the nation who are working to include a watershed approach to address their particular sustainable water infrastructure need. The Work Group's thinking and recommendations were informed by these discussions and interviews. Additional information from those interactions will be discussed in the findings and recommendations from the second phase of the Work Group activity.

## III. NACEPT Findings for Phase I

General Comments

During the course of interviews, examination and analysis of published materials, and discussions with experts and practitioners, the NACEPT workgroup has concluded that there is not a clear understanding broadly spread throughout the nation of the concept of a watershed approach to water management, and there seems to be even less knowledge about the relationship between a watershed approach and the impending need to address urgently the issues of water supply, water quality, and insufficient or deteriorating water infrastructure.

While some excellent examples of application of the principles and concepts exist, they often seem to emerge from independent actions at one place, not as part of a nationwide movement or state-of-practice. Many times, even the best examples of implementation are not able to accomplish a fully integrated program, but rather a part of such a program. This is not meant to be a negative comment on the potential value of the approach. Rather, it is a realistic evaluation of the progress the concept has made. In essence, it is a very young concept in terms of implementation. That means that one of the key barriers holding back it implementation is lack of knowledge about what a watershed approach includes and entails. Moreover, effort is necessary to answer other important questions at the local level in a way that encourages even consideration of the watershed concept. These questions include: what is the value of even considering it by an often disparate collection of public and private entities within a watershed area? Where can local groups go to get help to make it pay off for them? Local groups have some immediate needs and issues and this seems to be a long-term approach. How can they meet current needs with something so distant? How can they really estimate the benefit?

It is evident that EPA is working to help address these questions. For example, during the time NACEPT has been working with EPA on this issue, several announcements of initiatives, resources, and tools related to a watershed approach have emerged from the Agency. Among these are:

- an agreement to promote the use of green infrastructure to reduce stormwater runoff and sewer overflows
- a national conference on paying for water that provided opportunities to discuss watershed approaches
- a release of a watershed planning tool
- a focused set of activities, parallel to this initiative with NACEPT, that attempts to understand watershed issues from a utilities perspective

EPA has identified an important role of empowering the process through education about the mechanics and benefits of the watershed approach, encouraging consideration of the approach and facilitating implementation through creative and supportive use of permitting and existing financing options. At the same time the Agency works to minimize short comings and penalties because their resulting negative publicity is likely to inhibit initiatives by others in the future. NACEPT agrees with this approach and urges expansion of the approach as discussed later in this document. These tools of education, encouragement, and creative use of permitting and funding capabilities are important for EPA because much of the planning and work to address the water sustainability problem from a watershed perspective is at the state, tribal, and local level and not at the national level where EPA can take more direct action.

Some additional specific approaches and initiatives undertaken by EPA to facilitate and promote a watershed approach to sustainable water infrastructure are included in the following description of current EPA actions.

While EPA cannot require states, tribes, and localities to adopt the watershed approach, it does use its tools to create incentives, educate constituencies, and remove barriers. Further, when EPA becomes aware of a state's struggles with competing priorities and limited resources, EPA tries to identify areas to give flexibility while maintaining progress in base programs and on key priorities. Some examples of how the watershed approach is currently woven into EPA's programs include:

- NPDES (National Pollutant Discharge Elimination System) Watershed-Based Permitting
  - Permit writer training incorporating watershed approaches
  - Watershed-based permitting implementation and technical guidance
  - Trading policies, tools and training (point-point and point-nonpoint)
  - Wet weather strategies such as green infrastructure
- Section 106 Priorities
  - Strategic Plan & GPRA (Government Performance Results Act) priorities are highlighted during EPA-state workplanning
- Clean Water SRF (State Revolving Fund) criteria providing incentives and flexibility for targeting watersheds
- Nonpoint Source Program
- TMDLs (Total Maximum Daily Loads): EPA encourages states and tribes to develop TMDLs on a watershed basis (see EPA 1991 Guidance for Water Quality-based Decisions: The TMDL process).
- Cross-Program Coordination
  - Watershed sub-objective strategic targets include watershed outcomes, to which all surface water programs must contribute
  - Outreach and capacity building efforts, such as the targeted watershed grants, access to many tools via the web including a watershed portal, etc.

  - Sustainable Infrastructure Initiative and Green Infrastructure
    - While this is a new initiative, the Office of Water is working to develop an action plan that integrates Clean Water Act and Safe Drinking Water Act programs on a watershed-basis, to the extent statutory authorities enable such integration. This workgroup includes the active participation of the Office of Enforcement and Compliance Assurance (OECA).
    - EPA Administrator Johnson considers SI (Sustainable Infrastructure) and GI (Green Infrastructure) as part of his top priorities.
- Drinking Water Program
  - Source Water Collaborative
  - Long Term 2 Enhance Surface Water Treatment Rule incorporating a watershed approach and toolbox

Aspects of these issues and resulting recommendations are discussed in the NACEPT responses to the individual questions in the charge, which appear below.

NACEPT believes that although there are examples that show positive aspects of each of these questions, EPA can and should go further in each case. Some examples of successes that could serve as models for expanded activities include:

- EPA Region I issued enforcement orders simultaneously to all communities in the lower Charles River basin in order to address stormwater pollution, identified as the primary source of impairment (see Appendix 5).

- Connecticut POTWs have watershed based NPDES permits that allow nitrogen trading to reduce nutrient loading to Long Island Sound (see Appendix 6).

- EPA has issued a Watershed Plan Builder Tool and a related web site http://iaspub.epa.gov/watershedplan/planBuilder.do?pageId=51&navId39&sessionActive=true. In addition, there is a communication plan. The current plan for outreach is generally limited to promoting a "train the trainer" approach, for example ten training workshops per year for 40-80 people per workshop. The trainees would include NPDES program managers, TMDL staff, state, tribal and local staff and watershed groups. About 4,000 watershed planning handbooks were distributed and there are 1500 requests for additional copies. No provision was made to document the number of hits on the web or track the impacts of disseminating these resources, although this information may be available. NACEPT suggests that EPA develop a method to track the dissemination and use of these tools in order to quantify the success of this communication and training approach.

## Specific Findings and Responses by NACEPT to Questions in the Charge

In the following section, questions in the charge are discussed and specific recommendations are provided.

**Charge Question "A".** *How can the Agency more effectively promote increased collaboration among drinking water, wastewater and storm water utilities, local governments, planning boards and other stakeholders that result in collective water infrastructure priority setting under a watershed management context through education and other means?*

**NACEPT Response:**

Experience has demonstrated that attention and action by collaborating groups can be generated most effectively by use of regulatory actions or by providing funding to promote desired types of actions. In the case of promoting a watershed management approach to water infrastructure priority setting, the use of neither of these classic strategies is contemplated. Use of educational and related approaches can be useful, and perhaps essential. However, these types of approaches will be most effective if they can communicate a sense of urgency, a likelihood of success, a set of practical examples that have worked, some resources for assistance, and frankly some assurance that regulatory complications can be avoided and that cost savings will be realized if the watershed strategies are implemented.

To be most effective in such an initiative, the Agency will need to consider and respond to several parameters that are discussed below.

1. <u>Promotion of increased collaboration among these stakeholders will first require communication of a critical need and of the advantage of collaboration.</u>

   The group of stakeholders discussed (drinking water, wastewater and storm water utilities, local governments, planning boards and others), are not necessarily natural allies, nor in many cases do they usually work together collaboratively. A movement toward collaboration will occur most rapidly if a clear understanding of the need and advantage of such collaboration can be generated. This means among other things general educational activities for all stakeholders, and probably means as well focused communication and education within the professional organizations for each of these individual groups of stakeholders until key opinion leaders are convinced of the advantages of action and effectively communicate that belief to others in the category. For the Agency to be effective in this strategy will take careful planning, honing of the message for each group, and a very clear statement of the regulatory complications to be avoided and the eventual cost savings to be realized.

   A possible model for this multi-faceted educational approach is currently being implemented by the EPA Office of Water for source protection, which has developed approaches involving professional organizations, states and local governments, and the general population.

   NACEPT will work with EPA in Phase II of this Workgroup effort to develop some specific examples that illustrate what regulatory issues could be avoided and what cost savings could occur. The illustrations will serve to make the point.

2. <u>An important question is whether EPA can be effective in direct communication with this group of stakeholders in an effort to move toward collaborative action. Would indirect</u>

communication through the states be more effective? Who are these groups most used to listening to? What would be the response of states to what might be perceived as an "end run"?

The reality of this situation seems to be that because the audiences are different, the means of outreach should be different as well. The Agency can be most effective working on the national level with the national professional organizations and with the national press in order to communicate the needs and possible responses and encourage actions. To be clear, NACEPT realizes this is already happening. At the regional level, EPA can facilitate joint communication to and between states in the individual regions which share watersheds and share common challenges in watershed management. EPA Headquarters indicates that they are actively working with its regional offices to facilitate interactions with the states. In addition, EPA is communicating with ECOS (Environmental Council of the States) to encourage outreach to local entities in the states.

Communication and education with municipalities and local planning boards may be most effective if done by the individual states. There are several reasons for this, including the fact that these organizations are creations of the states and the networks of relationships and interactions may vary widely from state to state. Educational and communication programs tailored at the state level are likely to be more effective than a single national program. The development of an individualized program may benefit from a two-fold approach. Material from EPA could emphasize the national perspective and provide information about cases where success has been achieved. Each state could contribute local perspective that particularly emphasizes how a sustainable infrastructure watershed approach can be developed and implemented in that particular state. The material could provide information about state policy encouraging these types of innovative practices. Guidelines could be provided about which state agencies need to be contacted to obtain necessary approvals, permits, funding, inspections, or other oversight mechanisms. Ultimately the state portion of the training will be most effective if it conveys to the local officials that these actions are favored by the state, that procedures are in place to facilitate their forward movement at the state level and there will be no harm done to localities if they take this approach. EPA can help the states by providing guidance and background about how these messages can be conveyed most effectively.

This means clearly, however, that EPA will need an effective strategy to provide information, ideas, and resources to the individual states to facilitate the provision of the ultimate result—educational outreach to the municipal and local stakeholders. While the messages will need to be individualized at the state level, they should be consistent with national goals and expectations.

3. Is the Agency prepared or can it be prepared to transmit or develop specific area and regional information about need and existing water infrastructure capabilities to local governments and the other local stakeholders? If not, how can these stakeholders get the information that will support any efforts for collaboration in competition of other public concerns? A real issue may be getting the necessary level of concern and attention in the arena of public debate and priority setting.

If the expectation is that local authorities and utilities will modify their planning and operational approaches based on responses to real current and future needs and challenges, there must be a way to provide them with locally relevant information, data, and options in order to allow them to consider various scenarios and to make informed choices. The Agency needs to be able to point the stakeholders to locations where this information exists or to provide easy to understand guidance about how it can be developed locally. Local development of data or even assembling it for convenient use will involve costs that may impede the level of progress that is desired.

Much of the necessary information is available, although it is in different places, such as USGS, databases connected to well protection programs, storm water assessment program resources, and information from individual state databases. It is recognized that data on wastewater volumes may be more difficult to assemble, but will still be useful for this initiative. A useful approach to address this concern would be for EPA to develop guidelines about what information and data is important to gather in order to move forward with a watershed approach to sustainable infrastructure with specific suggestions about where and how to gather the information for specific locations. The more detailed this information can be, the more useful it will seem to local utilities and authorities. The level of detail may include what specific websites could be accessed and what specific offices can be contacted.

A larger issue related to these types of initiatives is that no group or entity is charged with bringing together people at the local level to initiate this type of watershed approach to sustainable infrastructure. EPA should encourage each state to identify ways to assemble and energize local groups to begin the work to achieve the collaboration and outcomes desired.

4. Because an effort such as this is voluntary and not regulatorily driven, a successful communication campaign would benefit from partnerships so that it is not seen as an EPA-only initiative. What organizations could be lined up as interested partners? Could they include the national associations of planners, mayors and municipal councils, water utilities, and watershed associations?

   An educational initiative such as this has multiple audiences and therefore requires different approaches in order to be effective. Ultimately, the necessary audience is the assemblage of rate payers and taxpayers. Informing that group of citizens can probably best be done by a coalition of the organizations mentioned, with a key leading role by EPA. Many ways to reinforce the message can be used by each of the stakeholders involved. However, achieving this degree of collaboration means that preparatory communication and education needs to be done first by EPA Headquarters and Regions and the individual states. This will not be an easy or quick task. Careful planning and allocation of appropriate levels of personnel will be required in order to achieve the results needed.

   There is an additional facet to the concept that this program will have multiple audiences. That is, the audiences will vary over time as well. Specifically, although an immediate educational program may well be successful in establishing a mindset favoring watershed-based sustainable infrastructure initiatives, in practice actual implementation

will come when there is a locally recognized need for expansion, upgrade, or replacement of existing infrastructure. In essence, this means a first wave of educational programs should establish a baseline of expectation that a watershed approach to sustainable infrastructure is valid, preferred and advantageous. A second wave must be ready and accessible whenever planning finally starts for changes in existing infrastructure. In some locations, that may be immediately, while in others it may be years away. EPA must see this effort as long-term—a set of actions that will need to be sustained.

There is an additional timescale issue that should be incorporated into the educational program as well, and in ways that reflect the multiple audiences. That is, people need to know and understand the long periods of time that will be incorporated into the use of this type of infrastructure approach. For example, they need to understand the time scale required to protect and rehabilitate natural water sources. They need to understand the expected lifespan of any infrastructure to be installed. This type of information can be expected to assist in decisions about investment and predictions of cost savings.

5. Is there a firm idea about who really needs to be educated and convinced? Is it the decision makers, the professionals and agencies, and the utilities, or is it the private citizens in the community who can urge the decision makers to act?

   As discussed previously, in order to achieve an effective educational program as measured by actual implementation of watershed approaches to address water infrastructure issues, all of these stakeholders will need to be educated and convinced. The challenge will come in selecting the methods and order of educational activities.

   The Agency has already decided that direct communication with the general public about this issue would not be the best use of their limited resources for education. Rather, they are developing relationships with WEF (Water Environment Federation) and similar professional organizations to promote knowledge about watershed-based sustainable water infrastructure to private citizens. The Agency resources can perhaps be most effectively used in providing educational opportunities for people in state agencies, professional organizations, and utilities. Examined more carefully, this means that EPA expectations in this area can perhaps be best met by recognizing and in turn encouraging recognition by states, utilities, and professional organizations that the advancement of the goals will require employees at all of these locations with specialized knowledge about the initiative and the steps required to make it work, including educational outreach.

   One strategy to assist in meeting the goal of specially trained staff who could aid in communicating with all audiences would be for EPA to develop a "communications toolbox". The toolbox could contain documents, videos, PowerPoint presentations and similar material including topics such as "Watersheds 101", as well as information about how water infrastructure is planned, built, operated, paid for, as well as the services it provides.

6. How best can the economic case for a watershed management approach be made?

   A particularly effective driver to encourage adoption of a watershed approach by local authorities will be a strong case that money will be saved. A part of an effective

educational program will be the provision of easy to use tools that can help local authorities and utilities predict advantageous economic factors if something other than the usual strategies are implemented. EPA could be particularly effective in providing these tools and approaches. Assistance in providing the data to use with the tool would be very helpful as well.

There appears to be a lack of well-documented case studies that illustrate the opportunities and strategies for cost savings from a watershed approach to sustainable infrastructure. This difficulty in identifying case studies that demonstrate cost savings is likely to be a disincentive for some local groups to investigate the approach. Even though EPA advances the watershed approach as one of the pillars of sustainable water infrastructure, good examples of successes are essential for making the case. There may be some examples that could be gleaned from work in the area of water quality trading. In general, it appears that the educational agenda would benefit from additional case studies, as well as from action to make any existing case studies readily available in the communications toolbox as well as in other accessible locations. NACEPT expects to work closely with EPA in the second phase of this student to identify appropriate case studies that illustrate cost savings.

7. Is there a clear and effective model that can be used to demonstrate how this type of collective decision-making can work? In reality, many decision makers likely will be concerned about loss of current decision-making ability and control over expenditures. Finding ways to answer these types of concerns could facilitate movement to collaborative decision-making.

   Organizational issues and sociological issues need to be considered and addressed if the collaborative watershed approach is to be successfully implemented on a broad scale. Even when a strong technical and economic case is made, individual decision makers will ask related questions that must be resolved before progress can be made. For example, permit applicants and governmental bodies may have an adversarial relationship. Less publicly stated, but equally real, may be issues of turf, prestige, and level of funding to be managed by each collaborating entity. In order to overcome these types of issues, clear models of how such collaboration can work, or has worked effectively, will need to be provided. This may be based on case studies of working projects or they may be based on careful consideration and guidelines of how to build collaborations. This is a real issue that must be overcome in order for the approach to be implemented successfully.

   While all of these constraints may exist, it is also true that all of the groups that need to be participating in this type of collaborative activity are interested in achieving efficiency and economic benefit in all of their activities. The taxpayers and ratepayers both expect and demand that. One strategy to overcome the natural reluctance toward collaboration would be to emphasize the organizational and operational benefits that can derive from what is in reality a systems approach toward sustainable infrastructure. Information and strategies to convey the information should be part of the communications toolbox that is provided to the people who have been designated to bring together the local groups to initiate planning for the watershed approach.

8. Promotion of this type of collaboration will require clear demonstration in the local context of advantage. Without that, natural resistance to the uncertainties of change will interfere with movement toward collaboration.

   Clearly, if the goal is change at the local level, including in some cases giving up some local decision-making opportunities to a collaborative regional group, a local advantage must be demonstrable. Therefore, all of the educational and communication activities must point to empowering local people to understand and predict the local impact on these drinking water, wastewater and storm water utilities, local governments, planning boards and other stakeholders. The overall program clearly has national benefit and perspective, but individual local people make local decisions based on advantages near them.

   To facilitate this level of local understanding and local decision-making, professionals will need to be able to communicate more effectively with the public about these issues. This will involve knowledge of how people obtain information, how they process it, how they check it for accuracy, and how they utilize it in decision-making.

**Charge Question "B".** *How can municipalities and other local government/regional planning entities build support for promoting a watershed approach to water infrastructure planning?*

**NACEPT Response:**

The first step in taking a watershed approach to water infrastructure planning is to generate public and inter-agency awareness of the watershed, which generally crosses jurisdictional boundaries (and does not align with most political boundaries). These awareness or educational approaches can take many forms:

- One or more localities working together, either because they share a utility district, a reservoir (and source watershed) or a river.
- The effort tends to be more successful or comprehensive when it includes the entire watershed or bio-region (including across state, tribal, locality, or utility boundaries).
- The larger scale of watershed planning means that regional organizations or alliances are better poised to initiate watershed planning, education and awareness efforts, even if actual project funding and oversight is at the locality or utility level.
- Successful watershed planning approaches can be initiated by regional organizations or non-profit groups, but are more successful if they take an 'all-hands-on-board' approach, including localities, utilities, large landowners, agriculture and business interests, environmental groups, and regulators.
- Related factors such as threats or apparent crises help promote watershed awareness – drought, impacts of growth and sprawl, flooding and other natural disasters, location of other treasured natural resources, and other local, regional, or state environmental initiatives (sustainability/smart growth, green design/green infrastructure).

Once there is awareness of the watershed, the planning approach can vary widely, depending on a combination of factors that influence who might want to be involved and what there primary drivers and interests are:

- Regional climate (dry or wet) and hydrogeology of the aquifer and drainage areas.
- Water source and method of use – reservoirs, wells, direct from river.
- Ownership, management, and size of drinking water and stormwater utilities.
- Regional economies – agriculture, industry, tourism, military.
- Areas where watershed boundaries cross multiple jurisdictions – tribes, multiple states, international boundaries.
- Abundance/scarcity issues – is there enough water, but not enough storage? Is it always dry, with occasional major storm events? Is quantity enough, but quality the issue due to growth and run-off?

Due to the complexity (and localization) of the above issues, the regional approach of awareness, education, participatory planning, and cross-jurisdictional cooperation may lead to longer-term solutions across the entire watershed.

- By incorporating watershed education into other public planning exercises (transportation and land use, rural development, agricultural, hazard mitigation, community plans, schools, parks, airports, etc.) overall awareness of a watershed approach can be raised.
- Following the 'golden rule' of regional planning – 'regional awareness and coordination, local decision-making' – localities, tribes, landowners, and utilities will be more likely to stay in the game and show all their cards.
- Raising awareness of the cost and quality of life implications of the 'business-as usual' approach, along with the potential savings and benefits over time of a greener watershed-based approach (green roofs, low-impact high-performance design like green streets, more compact development) can get the attention of the decision-makers in both the public and private sector.
- Express the 'sense of urgency' within the watershed about infrastructure issues that will help coalesce a broad watershed action alliance and bring decision-makers to the table. This can be quantified by conducting a regional build-out analysis, using a computer model that identifies and quantifies the future regional impacts (on water quality and quantity, air quality, land cover, traffic, infrastructure costs for transportation, water, sewer, and schools, etc.).

**Charge Question "C"**. *Using relevant examples from the recent Cooperation Conservation Conference, what are the ways in which "cooperative conservation" or "coordinated resource management" has been or can be used to overcome barriers to promoting a watershed approach to water infrastructure planning?*

**NACEPT Response:**

Interior Secretary Dirk Kempthorne joining with the Secretaries of Commerce and Agriculture, the Administrator of the Environmental Protection Agency, and the Chairman of the White House Council on Environmental Quality hosted listening sessions on cooperative conservation and environmental partnerships.

The recent Cooperative Conservation Conference discussed ways that "cooperative conservation or coordinated resource management" has been or can be used to overcome barriers to promoting a watershed approach to water infrastructure planning. Though these challenges are listed as individual elements, they are best accomplished and approached simultaneously.

- enhance wildlife habitat, species protection, and other conservation outcomes through regulatory and voluntary conservation programs.
- enhance cooperation among federal agencies and with states, tribes, and local communities in the application of environmental protection and conservation laws.
- work with states, tribes, and other public- and private-sector partners to improve science used in environmental protection and conservation.
- work cooperatively with businesses and landowners to protect the environment and promote conservation.
- respect the interests of people with ownership in land, water, and other natural resources.

The conservation model exemplifies the use of conservation principles, policies and practices to provide for the protection, storage and distribution of natural resources within an urban and regional pattern that assures smart growth and integrates the before mentioned elements.

Therefore viewing the above list as connected rather than segmented elements within a plan, all resolved simultaneously, creates the opportunity to connect funding sources with multiple issues, stimulating groups and agencies to work together to create a plan.

While there a several success stories where most of the components of cooperative conservation have been melded with a watershed approach toward sustainable infrastructure, two examples include: the outcome of Cache Valley, Utah activity within the Sustainable Design Assessment Team (SDAT) program of the American Institute of Architects, and the Diablo Trust in Arizona, a collaborative land management program.

**Charge Question "D"**. *How can EPA, States, or others influence various community stakeholders to adopt and promote such an approach?*

**NACEPT Response:**

Experience working with several water resource-related programs where groups have come together to agree on an action plan reveals that:

1. Stakeholders want to do the right thing but they define their "right thing" very narrowly. They are generally looking at the problem from their own vantage point. In this context, everyone is doing the right thing but the end result does not result in synergy. Very often, their approaches contradict rather than complement. The first step to overcoming this barrier is providing a forum where stakeholders can periodically meet and share their experiences – conference, meeting, sessions. Some states are providing guidance to communities about how to approach planning for water resources and infrastructure planning from a watershed perspective. For example, Massachusetts has recently issued a document titled "Water Resource Management Planning, a Guide for Towns and Communities" (http://www.mass.gov/dep/water/laws/policies.htm).

2. Scientific reports and data are powerful identity builders. Scientific reports cannot be the end of the process, but they offer excellent starting points. EPA can assist in ensuring that scientific reports are available on watersheds.

3. Grants, even though small, can provide big incentives for stakeholders to come together and create a synergistic working environment. Several EPA programs that were popular with local citizen groups have been eliminated or substantially cut back. The Regional Geographic Initiative gave the EPA Regions substantial latitude in the past to fund regional priorities but their funding has been cut back to the point that the likelihood of funding for local groups is very small and they, therefore, do not even apply for that reason. The previous funding program had few strings attached and required only a 5% match which made it easier for local watershed-based groups to apply and carry out the grant program objectives. It was used generally for studies or on-the-ground implementation projects. Groups were able to apply for $50,000 for good projects determined by the Region. Presently they may be able to receive $10,000 and have to compete with dozens more organizations for much less money. This is very disappointing to the local groups and doesn't help EPA's agenda of involving local watershed groups.

   In the past, these local groups accomplished a great deal in advancing watershed-based approaches with Section 319 funds. Now with the elimination or substantial reduction of other sources of funding (federal, state and private combined), however, the Section 319 funds are just about the only option available to support activities of local groups. This makes competition extreme while the need continues to grow. Because Congress is asking why more streams aren't coming off the 303d list, states are prioritizing impaired segments at the expense of many other good projects. Many local groups in the past hesitated trying to have their stream segments listed because of their perception of the stringent requirements of the TMDL process. Now it appears to many of those groups that the only viable approach is to have them listed, making the list longer and perpetuating the appearance that little is getting done. It is still not required to be on the 303d list to work on non-point source pollution problems. With the increase in competition, though, many states are moving towards prioritizing mostly the impaired waters in order to document success. There need to be additional ways to document success and that respond to these concerns. Much good work is being done locally and much more can be done to show improvements using other criteria. Either Section 319 eligibility should be expanded or other sources of funding should be reinstated or developed.

4. EPA watershed programs and initiatives must respond to the fact that all communities are unique. No uniform formula will work with all of them. For example, two separate initiatives were undertaken with two Florida communities barely 50 miles apart but the two took very different approaches and reached the same end point. The success of the facilitation resulted from allowing them to embark on different paths. Similarly differences exist among large regional watershed initiatives such as those in the Chesapeake Bay, Great Lakes, Long Island Sound, Everglades, Pacific Northwest that are funded by regional to the level of up to $20 million/year. These differences provide useful illustrations of how standard watershed approaches can be successfully applied to geographically and ecologically unique situations. However, some unique geographic/ecological niches do not yet have such an initiative. A case in point is the Rocky Mountain Region although the area supplies water to 100 million people in 19 states and two countries.

5. There is no substitute for local monitoring leading to increased public awareness.

6. There is a set of barriers that inhibits adoption of watershed efforts by local groups. These barriers include:

    - No financial ability or financial support to establish a watershed planning effort. Local groups often do not have the ability to pay for joint watershed planning efforts.

    - Lack of leadership to bring the parties together. Leadership is imperative to formulating watershed planning groups.

    - Lack of interest or lack of knowledge about unifying issues or problems and the benefits of watershed level planning.

    - Multi-jurisdictional issues cause conflict and lack of trust. This stifles the ability of key players to make a commitment to joint planning.
        - State/Tribal
        - International

    - Water rights conflicts (lack of finality in water rights) cause lack of communication, trust and interest in joint watershed planning, especially in inter-state, tribal/state, watershed settings.

    - International conflicts limit the ability to do complete watershed planning when international borders bisect watershed boundaries.

**Charge Question "E"** *What are the specific barriers (and recommendations for addressing them) embodied in existing EPA or state policies or practices that need to be addressed to help EPA and states further encourage and assist entities to consider and implement alternative and/or integrated approaches for water infrastructure planning and management?*

**NACEPT Response:**

Over the past several years, watershed-based infrastructure planning has been bandied about in a number of forums: conferences, reports, studies, and, in some limited instances, actual application. It makes perfect sense to plan, design, and construct water infrastructure (drinking water, stormwater and wastewater) using the watershed as the basic hydrologic planning unit. Since the purpose of these projects is to improve or restore water resources, it is only logical that watershed-based planning is essential for projects to be successful.

As early as the late 1970's and early 1980's the so-called "208 plans" for water quality improvement under the Clean Water Act called for watershed-based, decentralized, infrastructure planning. The watershed approach resurfaced in the early to mid-1990's as states began conducting water quality monitoring, assessment, and permitting by watershed to bring to bear watershed science in regulatory decision-making. North Carolina was probably the first to go to a five-year rotating watershed cycle for integration of its water quality programs. Massachusetts and others developed similar programs, and by the mid-1990s most states had embraced this as a best management practice for efficient and effective administration of its programs, if for no other reason.

This system empowered watershed associations and increased stakeholder involvement in decision-making, which was the intent of the watershed approach.

So, here we are in 2007, and we ask the question: "Why isn't watershed-based infrastructure planning the standard practice? What are the barriers that must be addressed for watershed based infrastructure planning to become a reality not just in a few cases, but more broadly across the country?"

A significant answer to this question is very simple but solving the problem is politically challenging. One simple answer to the question is this: "Projects follow money. Projects follow regulations." If neither funding requirements (ranking criteria) nor regulatory requirements steer projects very strongly in this direction, watershed based infrastructure projects won't happen unless they are driven by local forces. While local forces are very powerful, they are circumstantial and unpredictable. If the USEPA wants to drive projects in a watershed direction, simply supporting local decision makers, writing up their successes in journals and newsletters and giving them awards won't get the job done, by a long shot. We can continue to talk about it in theory, and we can point to a case study or two, but we will be talking about the rare exception, not the mainstream reality.

While EPA's Office of Water (OW) has been developing its thinking and adapting its practices around a watershed approach for a number of years, OW actually began to restructure its program to address "protecting water quality on a watershed basis" beginning with the 2003-2008 Strategic Plan and continuing with the 2006-2011 Strategic Plan.[2] Over time, programs such as TMDL, Water Quality Standards, NPDES, CWA (Clean Water Act) Section 106 Grants, Source Water Program, and the Clean Water and Drinking Water SRFs have been working to incorporate watershed principles in guidance, policies, initiatives and priorities, keeping in perspective the fact that EPA cannot tell states and tribes how to spend their own funds.

Despite this and the many watershed focused efforts of EPA's OW, until very recently there has been little explicit incentive for integrated watershed-based (or other alternative) infrastructure planning embodied in EPA policies or regulations, as viewed from the perspective of many states. EPA has incorporated watershed planning in its Long Term 2 Enhanced Surface Water Treatment Rule, and it has engaged a Source Water Collaborative with thirteen national organizations to build drinking water protection into land-use planning and stewardship. We recognize that OW has recently initiated its Sustainable Infrastructure Initiative, representing a significant new undertaking to promote this kind of integrated planning. NACEPT urges EPA to follow through on this effort and ensure all EPA offices (including the Office of Enforcement and Compliance Assurance and the Office of General Counsel) embrace it.

Regarding specific aspects of the Water program, NACEPT finds that certain barriers need to be addressed. For example, approximately 20-25% of wastewater treatment infrastructure is financed through the SRF program, and water and wastewater utilities are facing a large financing gap. As a result, state and local programs are consumed with finding adequate amounts of funding and long-term management of infrastructure rather than integrated planning approaches. Success has traditionally been measured primarily by things like dollars spent, projects built, millions of gallons of wastewater treated, population served by sewers, and rarely if ever, water quality improvements or watersheds restored. EPA should improve its internal coordination – even though OW programs promote watershed approaches, the Clean Water SRF program and the Section 106 grant program need to do a better job incentivizing utilities to operate programs on an integrated watershed basis. One tool might be increasing emphasis on linking SRF expenditures with water quality and watershed improvement. EPA has been successful in working with states for voluntarily reporting data on loans in order to demonstrate use of SRF to restore and protect water quality for various uses. This information should be explicitly used in planning.

Similarly, the NPDES program needs to help states streamline their programs to maximize efficiency in permitting, in order to preserve resources for watershed-based planning and implementation. For example, states struggling with resource limitations have urged EPA to support administrative renewals of some permits to allow more focused attention in priority watersheds. In addition to EPA's recent shift in emphasis to 'priority permits' and priority watersheds in its measurement systems, EPA needs to assist states with finding ways to extend permits that don't need revision in order to avoid unnecessary re-permitting. In doing so, EPA should keep in mind that there may be complications to be addressed that result from legal review of these approaches.

[2] See http://www.epa.gov/ow/waterplan/

Water withdrawals, wastewater discharge and stormwater systems must all the integrated into watershed-based infrastructure planning but there does not appear to be a centralized coordinating mechanism to push this at EPA, and often in the states. There is also very little in the way of policy or guidance to encourage states and communities to do such planning (though in Massachusetts, integrated water resource management planning guidance is nearly complete and will go a long way towards addressing this). The following recommendations are offered to help EPA identify ways to assist states with such integrated, watershed-based, resource planning.

# IV. Recommendations

In addition to the findings we offer in response to EPA's five questions to us, NACEPT also provides the recommendations below for EPA action to promote the watershed approach to sustainable water infrastructure. We found that our recommendations fit into four categories (that overlapped, diverged, and generally did not fit neatly within the five questions): leading by example; educating, communicating, and providing communication; encouraging, facilitating, and funding collaboration; and developing, using, and funding specific tools. We view each of the four categories as equally important and critical to EPA's successful implementation of a watershed approach. Within each category, we have sought to generally prioritize our recommendations, with the highest priorities appearing first. The highest priority recommendations are as follows:

Highest Priority: Recommendations 1, 3, and 4

Very High Priority: Recommendations 5, 19, and 20

High Priority: Recommendations 2, 4, 21, 22, 23, 24, 25, and 26

**Lead by Example**

1. Organize internally and name a coordinator. Neither policymakers nor the public have much understanding of a watershed approach or its benefits in providing sustainable water infrastructure. As the first step in raising awareness and building the support necessary for success, NACEPT recommends that EPA start at home by making this a visible priority.

   EPA should assure that all components of EPA's organizational structure, including the Office of Enforcement and Compliance Assurance (OECA), effectively support watershed-based program implementation by promoting common integrated themes and messages. In part, this can be accomplished by aligning the goals and objectives of each office, division, and region sufficiently to promote a harmonious unified watershed approach, so that all stakeholders throughout the country can implement watershed-based infrastructure decisions. This is asking a lot of EPA, and any particular office or division is likely not to be able to have the resources or institutional support to undertake this role. Instead, to best integrate such an effort across the Agency, the Administrator should name a coordinator and coordinating team and identify them and the watershed approach as a priority. By being better organized internally to promote the watershed approach, EPA then will be better able to help tribal, state, and local officials with a truly integrated approach and strategy.

2. Initiate at least two innovative watershed infrastructure projects in each EPA region. NACEPT recommends that EPA designate a national high level action group (such as the Innovation Action Council or a similar group) to work with stakeholders (tribes, states, local officials, watershed associations, businesses, etc.) to undertake and provide seed

funding for at least two innovative watershed infrastructure projects per region. The objectives of each pilot are to: (1) define needs and watershed boundaries, (2) integrate drinking water, clean water, and stormwater infrastructure issues, (3) discover any obstacles inherent in EPA's practices and structure, and find solutions, and (4) ultimately, improve EPA's ability to use the watershed approach more effectively and embed it into standard practices. The group should include a top level decision maker from each EPA Region (a Deputy Regional Administrator or Water Management Division Director) and from Headquarters offices (Office of Water and OECA). These personnel should have the authority to take risks and should expect to be evaluated on the program's success. NACEPT further encourages at least one of the projects in each EPA region to include a tribal authority, and the tribes should participate in defining the watershed boundaries, the problem, and any solutions. For example, given the recent national attention due to wildfires, rapid development, habitat protection, water quality, and water supply, the watershed including Lake Tahoe in Region 9 might be a candidate project under this initiative. We also hope that at least one of the projects involves a watershed that is transected by an international boundary.

3. Reward collaboration. As part of the promotion of a watershed approach, EPA's personnel and training policies should recognize and reward the important role of collaboration. EPA staff should be able to be fully engaged as partners in local and regional watershed initiatives. Even something as basic as regional staff attending and participating in local public meetings will demonstrate EPA's commitment to making the watershed approach work and will pay benefits in terms of receptivity by all stakeholders.

## Educate, Communicate, and Provide Information

The next two sections and their recommendations are integrally related regarding what needs to be communicated, to whom the information needs to be communicated, and with whom the parties providing and receiving the information should be collaborating. EPA has the opportunity to play several important roles in promoting the watershed approach. One involves being a national leader, provider of general information, author of national policies, and funder. Another is to work at the watershed level by providing staff resources, watershed-specific information, flexible application of national policies to local situations, and localized funding.

4. Illustrate the urgency of the need to adopt a watershed approach for sustainable water infrastructure. Because very few people know about the watershed approach or its benefits, NACEPT recommends that EPA illustrate and emphasize through its stakeholder partnerships the urgency of meeting current and looming water problems and meeting them with sustainable, locally designed water infrastructure solutions. EPA is making concerted efforts to communicate with the water professional communities about the infrastructure shortfalls and huge costs (of addressing them in the traditional ways), but EPA also should make strong efforts to reach local stakeholders and decisionmakers more directly. Given EPA's limited resources and personnel, EPA should start by utilizing its already existing communication partnerships with national associations of local governments and local watershed groups.

5. Help incorporate watershed principles in college curricula and research programs. Realizing that achieving a sustainable water infrastructure will require a combination of near- and long-term actions, NACEPT recommends that EPA begin now to initiate the design of watershed-based curricula for colleges and universities, including tribal-supported colleges and continuing professional education programs. By building knowledge, support, and capacity for using the watershed approach to sustainable water infrastructure, schools can help make this a well-integrated component of academic study, increase its recognition as a viable and valued approach in the water field, and give the approach dignity and credibility as a career choice and professional field. EPA could assist this effort in several ways, by: (a) developing a forum for academics to determine what priorities should be taught and how to encourage cross disciplinary approaches with such fields as architecture, land-use planning, and infrastructure planning; (b) informing the academic community about the potential job market for graduates with this type of training (through surveys of water utilities, for example); (c) collaborating with the National Science Foundation to provide research support for focused watershed approach research and innovative curricular development projects that incorporate watershed approaches; and (d) discussing with accrediting agencies, such as ABET, Inc (formerly known as the Accreditation Board for Engineering and Technology) how to best to communicate with individual academic programs about the value of including sustainable water infrastructure approaches in the course of instruction.

6. Identify key stakeholders, survey their needs, and together develop an educational/communication program. To be successful, EPA will need to create a comprehensive education and communication program. Key players include EPA Headquarters (at least OW, OECA, and the Administrator's Office), regions, tribes, states, local governments, and national professional water organizations. Other potential groups include historical societies, cultural institutions, recreational associations, schools, friends of parks organizations, and farmers.

   Because it will be unwieldy to start, EPA also should develop milestones and timetables to develop such a unified theme. Critical to this effort's success are strong partnerships between the EPA regions, tribes, and states, which generally are responsible for adapting and implementing the national priorities on specific issues. As a first step, NACEPT recommends that EPA survey these partners and key stakeholders to identify what they see as their particular needs, the expected benefits, and the likely hurdles and solutions. For example, EPA could survey all the regional councils of governments (generally voluntary groups of local governments that focus on identifying and addressing regional issues). The survey also could explain the watershed approach to sustainable water infrastructure, provide information about available tools and funding opportunities, and offer to assist in implementing the approach.

   Armed with EPA's current knowledge and this new outside information, EPA would be in a better position to facilitate the preparation and provision of effective guidance, tools, and information to stakeholders. EPA also should beef up its current watershed website (www.epa.gov/watershed) to offer information (as more fully discussed below) about

how the watershed approach can benefit sustainable water infrastructure, as well as data, case studies, and links to other related programs and information.

When any part of EPA announces a national or local watershed initiative, partnership, database, or report, EPA should seize that opportunity to connect the announcement to EPA's overall watershed communications program. Through such strategic, concerted efforts, the public and key decisionmakers are more likely to begin to understand the watershed approach.

7. Identify the needs of local stakeholders. In addition to surveying national groups about their needs, EPA also can play an important role for specific watersheds. At the watershed level, EPA can do many things to empower the local community, such as providing scientific data, a common forum, grants to develop a working relationship, and recognition of their unique conditions. Where EPA may want to assist with a particular watershed, it should first assess the local stakeholders' needs in order to determine how EPA can best assist that unique watershed. This may mean identifying individuals within the regions that can provide localized responses to questions or requests for information, as well as ideas for strategies helpful for that specific watershed. It may mean establishment of locally available facilitators (perhaps at universities based on the model of EPA's Technical Outreach Services for Communities program) to help establish and facilitate the establishment of the local groups. This may, in part, be achieved through a communication effort since EPA is currently doing many of these activities.

8. Help provide watershed specific data to local decision makers. EPA could promote faster and broader adoption of a watershed approach at the local level by providing local stakeholders with easy access to databases about their watershed's water quality and quantity. EPA regional personnel frequently are the most knowledgeable about a local watershed's conditions, so EPA should encourage regional personnel to share their information and collaborate with watershed stakeholders. Where the data is in the hands of other federal agencies, such as the United States Geological Survey or the Army Corps of Engineers, EPA should facilitate the sharing of this information and promote easy links where possible. Where necessary, EPA should consider entering into a memorandum of understanding with appropriate agencies to best facilitate this sharing and coordinating of information.

   EPA's STORET website (STOrage and RETrieval, www.epa.gov/storet/) is a repository for lots of water quality, biological, and physical data. STORET can be a valuable starting point, but EPA will need to work with other agencies to enhance its website (either STORET specifically or the general EPA watersheds site) with more information on the connections between its watershed and water infrastructure, including green infrastructure, approaches. If STORET is not the appropriate vehicle, perhaps EPA could establish a Watershed Technology Center that provides stakeholders access to watershed-based data, expertise, and communication.

9. Communicate cooperative conservation watershed success stories to local communities. In communicating with local stakeholders about watershed approaches, EPA should include not just general benefits information but also the story of how local cooperative conservation successes took place. EPA should highlight the critical connections between community, economic and environmental groups and discuss how the activity was funded, what innovative approaches were taken, and what lessons were learned. The presentation of lessons learned should include the effective push-pull factors, together with suggestions for avoiding the pitfalls and empowering successful processes. This information source should have an internet component. The website should not, however, simply list old projects, but it should be integrated into EPA's main watershed website, include an analysis of the overall approach and reference the individual projects, allow project participants to add comments and communicate with others about their projects, and be up-to-date.

10. Establish follow-up approaches to validate the watershed and cooperative conservation approaches. EPA should establish follow-up processes to validate the continued success of its efforts, particularly as the watershed and cooperative conservation approaches discussed here are new and should have a strong feedback and continual improvement loop. Specifically, EPA should want to assure that information about and enforcement of its regulations realistically support and actually yield implementation of watershed-based actions, such as watershed-based TMDLs, watershed-based permitting, watershed pollution trading, and watershed-based compliance and enforcement activities. Critical follow-up questions to ask would include: what practices were used to form a local group to maintain the project's stewardship, how was the group structured and funded, was the project successful in the long-term, and what changes would the participants have made?

11. Develop and use training materials to integrate the watershed approach into others' planning. NACEPT recommends that EPA develop short educational and training materials on how to integrate a watershed approach into other agencies' planning projects. These materials should help raise awareness and stimulate opportunities with federal, tribal, state, and local agencies and with the other groups involved in planning projects. Many of the how-to materials related to effective processes are already available, so the new materials should be technically-focused.

12. Directly facilitate communication among jurisdictions about a watershed approach. EPA should directly facilitate communications between jurisdictions to actively develop the watershed planning approach. Given its credibility, data, resources, and personnel, EPA could help bridge the gap between jurisdictions, engage in regional and even international discussions, provide leadership (and financial support when necessary) where watershed planning is needed and leadership is lacking, and offer guidance to groups in defining unifying issues and benefits of watershed planning. NACEPT suggests that EPA initially implement this as a pilot program as part of the demonstration projects proposed in Recommendation 2, in order to identify approaches that are effective and strategies that can be transferable.

13. Expand communications with local government through EPA's Local Government Advisory Committee. NACEPT recommends that EPA work to nurture and expand these developing initiatives through the EPA Local Government Advisory Committee. This could help provide two-way communication with local government officials throughout the country about a watershed approach to sustainable water infrastructure and its issues, problems, perspectives, and potential solutions.

## Encourage, Facilitate, and Fund Collaboration

One of EPA's critical roles regarding a watershed approach is to find the best ways to help bring people together to achieve their water goals. EPA is not likely to be the lead for many of these projects, but it nevertheless can have a significant role in helping bring people together.

14. Participate in and leverage other agencies' activities, particularly planning. In addition to working with its sister agencies to communicate information, EPA also should partner with federal agencies to coordinate their work on watershed projects and reduce unnecessary overlap, hurdles, and mixed signals. Obvious agencies to partner with are other water-focused agencies, such as the United States Geological Survey (USGS) and the Army Corps of Engineers. In addition, some sister federal agencies such as the Department of Agriculture and the Bureau of Land Management have direct responsibility for large areas of public land that are integral parts of watersheds. EPA should work closely with them to promote the watershed approach in their activities. In this case, the federal agencies should take the lead in collaborative approaches with states, tribes, local governments, and local utilities in carrying out actions that provide overall benefit to the entire watershed. These approaches should also illustrate the important value of both rural and urban portions of watersheds to the overall sustainability of the nation's water infrastructure.

    Many other agencies conduct extensive regional and local planning for various projects that impact watersheds. Because many of the impacts on watershed infrastructure are generated by growth and housing development, runoff, industry, agriculture, and other land uses, watershed planning is best conducted as part of a broader effort that helps defines how and where communities will grow. The same approach can apply to planning for schools, parks, airports, and other facilities with major potential watershed impacts and the potential to bring a variety of interests together. NACEPT recommends that EPA leverage and participate in as much of this planning as possible.

    This cross-program, multi-jurisdictional approach stretches funding, saves time for the public, decision-makers, and agency staff, and helps communities develop better plans and projects. In order to facilitate the EPA role in these processes and to provide maximum watershed benefits, EPA should carefully determine the connections between water infrastructure and watershed issues and the particular project being planned. Although each location likely will have its unique factors, common themes will exist. Communication of effective responses to these themes will help EPA advance solutions that integrate sustainable water infrastructure into the other agencies' planning objectives.

We recommend that EPA:

a. Identify what kinds of land use planning other federal agencies are funding and convening. For example, the Federal Highway Administration has initiated a program titled, "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (see Appendix 4). Other agencies that fund or lead land use planning exercises include the Federal Transit Administration (most likely through state departments of transportation), metropolitan planning organizations, the Department of Agriculture's rural development program, the Department of Housing and Urban Development's Community Development Block Grants and Home Investment Partnership Program, the Army Corps of Engineers, the Bureau of Land Management, and the Bureau of Reclamation.

b. Direct the regions, as part of the pilot projects proposed in Recommendation 2, to identify specific planning opportunities to test this strategy at the tribal, state, regional, and local level. Because many watershed efforts are conducted at a regional level, the regions could convene an information-sharing session with regional planning councils and metropolitan planning organizations to learn about upcoming regional planning efforts and to share information about funding for watershed initiatives.

c. Strongly encourage states, tribes, utilities, and non-profit grantees to identify such broader planning efforts and include watershed infrastructure planning in them. For example, competitive grant funding for watershed initiatives could offer bonus points for coordination with other regional planning efforts.

d. Participate in an extensive participatory process (i.e., charettes) in which the broader community or region has established their values and goals. These shared values (typically including but not limited to watershed issues) then should serve as the basis for what the scenario analysis measured in its modeling (as was done in Envision Utah and the Eastern Planning Initiative's Sustainability Accords; see Appendices 8 and 9).

e. Use existing planning models (such as INDEX, CorPlan, and CommuityViz) to incorporate limited analysis of watershed impacts into transportation and land use alternatives. EPA also should work on integrating (or at least connecting) EPA water models with such scenario planning and analysis models.

f. Participate in regional scenario planning initiatives, with the Federal Highway Administration and the Federal Transit Administration, which develop and test alternative futures for economic development, transportation investment. This would be a good opportunity to demonstrate the pre-NEPA (National Environmental Policy Act) potential outlined in SAFETEA-LU (Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users). This may be especially useful in fully integrating into a watershed-based environmental approach the analysis of transportation and land use alternatives; historic, cultural, and tribal assets; and green infrastructure principles. Scenario planning examples include California Blueprint (see Appendix 7),

Envision Utah (see Appendix 8), and the Thomas Jefferson Planning District Commission's Eastern Planning Initiative (see Appendix 9).

g. Expand community awareness of watershed issues during planning to groups and agencies that are focused on other issues, such as transportation, housing, land use, agriculture, tourism, economic development. This can be done efficiently by targeting the conferences and publications of relevant national associations, such as the Association of Metropolitan Planning Organizations, the National Association of Regional Councils, the American Planning Association, and the National Association of Development Organizations.

h. Offer watershed planning and funding as an opportunity for other planning efforts (the reverse of leveraging EPA watershed funding by attaching it to other agencies' planning). Where a community is planning a watershed-level infrastructure project, that investment (and public attention) can be leveraged to address transportation, housing, or community development issues – and broaden the support for watershed-level issues. One example is the Columbus (Georgia) Water Works watershed initiative that used a broad partnership to leverage a water infrastructure project into a downtown and riverfront revitalization project, coupled with an environmental education center.

15. Increase collaboration among the full range of water-related utilities. Another opportunity is for EPA to build upon and leverage its existing partnerships and alliances to promote collaboration among water supply, wastewater, and storm water utilities, and industries in a given watershed area. This would give them a more effective voice with local decisionmakers and stakeholders. EPA, tribes, states, and utilities should elucidate the benefits of working together to the many different types of organizations that might participate in the watershed approach.

EPA could use the partnerships being formed for the source water assessment processes and vulnerability assessments. In Region 3, for example, EPA offered initial guidance in the creation of the Schuylkill Action Network, which is working successfully to improve its watershed resources in Pennsylvania by partnering with federal and state agencies, local watershed organizations, water suppliers, and local governments (see Appendix 3). The EPA Office of Water should identify other existing Clean Water Act and Safe Drinking Water Act programs for melding them to facilitate a watershed-based approach to locally relevant infrastructure issues.

16. Develop effective approaches to bring together groups of stakeholders within a watershed. EPA should give more attention, and perhaps detailed research, to the question of effective models or approaches that can be used to bring together stakeholders in a watershed to achieve a common good, even if it brings certain costs.

17. Encourage state and tribal environmental agencies and utilities to join integrated watershed planning efforts. EPA should identify strategies to encourage state and tribal environmental agency and local utility staff to join in integrated planning efforts and to coordinate them with their own agency plans and investment strategies. EPA should communicate with the tribal and state agencies that set utility rates about the potential cost reductions that could be achieved by using this type of coordinated planning approach. EPA also should help states and tribal authorities understand that if they use the watershed approach to pick the most important water quality/quantity problems, then their stakeholders will be more likely embrace the watershed approach as the best way to solve them.

18. Extend partnerships with water professional organizations for effective communication with rate payers. As the ultimate decisionmakers for many watershed issues, water ratepayers have a significant role and need additional education on the watershed approach. NACEPT recommends using its existing partnerships with professional water and water utility organizations (both public and private) to help communicate to ratepayers that the watershed approach uses money more wisely to achieve the necessary infrastructure results. Because the watershed approach is relatively new and the period of each interaction with the public is short, this must be seen as a long-term program that must be regularly refreshed and updated. EPA could develop a series of "factoids" of successful projects and partnerships as the basis for the educational content, which utilities could use in such materials as customer bill inserts.

## Develop, Use, and Fund Specific Tools

EPA's role does not end with aiding communication and collaboration. EPA's regulatory, enforcement, and funding initiatives also can play significant roles in actually achieving successful local watershed projects using a host of existing and possible tools.

19. Use Stormwater Phase II authority to ensure that transportation projects incorporate green infrastructure principles. NACEPT recommends that EPA actively pursue its Stormwater Phase II authority to ensure that transportation projects incorporate green infrastructure principles (see below), that transportation projects and watershed plans are coordinated, and that eligible transportation funding be made available to support these efforts. Where appropriate, related authorities under phase I or other funding programs also should be used. These coordinated efforts would help ensure that transportation projects have minimal negative impacts on the watershed, that stormwater systems are properly sized, constructed and maintained for watershed protection, and that water infrastructure needs are appropriately addressed.

20. Apply a "hold harmless" approach to promote multi-program scenario analyses. NACEPT recommends that EPA determine whether a 'hold-harmless' approach can be applied in certain situations. For example, where localities and utilities agree to participate in a more complicated multi-program scenario analysis, EPA could give them more time for certain regulatory reviews, including permitting and enforcement, or

streamline or conduct simultaneous reviews. The most typical example is where transportation, land use, and natural resource planning (by a metropolitan planning organization or regional planning agency using transportation funds) is conducted independent of water, sewer, and stormwater infrastructure planning (by a water agency) because different laws and rules impose different timetables – even when the studies address the same watershed, at the same time, with competing public workshops and for the same elected decision-makers. A more efficient and effective approach would allow the water agencies the time needed to conduct their planning in parallel with the related land use effort.

21. Use NPDES permits to provide watershed-wide monitoring. EPA, with tribes and states, should use the NPDES process's available flexibility to encourage permittees to transition some of their current end-of-pipe outfall monitoring to a more meaningful watershed-wide data approach. EPA could do this by modifying the frequency and details of a permittee's NPDES end-of-pipe monitoring conditions.

22. Fund local watershed groups and unique multi-jurisdictional watershed improvement projects. NACEPT recommends that EPA reexamine its funding opportunities for local watershed groups and pilot projects to encourage smaller, more locally do-able watershed initiatives linked to infrastructure needs. Such local involvement can build upon the typical energetic participation of local people committed to the watershed, build broader understanding of the connection with water quality/water quantity issues, and provide significant leverage for EPA's funds. Providing seed money for such multi-jurisdictional watershed efforts is one of the surest ways for EPA to demonstrate to the broader population the benefit and contribution of linking a watershed approach with sustainable water infrastructure. Such funding should be given with the expectation that it will encourage new project development and that it will help leverage others' funding. Such initiatives can be facilitated if each region has the means and the charge to meet with each state and tribe to help them promote a watershed approach.

More specifically, NACEPT recommends three changes in current funding priorities:

a. Supplement 319 grants. EPA should allow the Section 319 grant program to provide additional funding initiatives for local watershed groups. Such new or reinstated initiatives could take advantage of matching by existing state funds for water quality and watershed enhancement projects. One approach might be to fund at higher levels the Regional Geographic Initiative (RGI), which allows the regional offices to leverage funding innovative solutions to local environmental issues through partnerships. For instance, the RGI could be very helpful in leveraging funds from Colorado's Watershed Protection Fund (a voluntary state income tax check-off program that raises about $100,000 each year for local watershed groups) and would encourage project buy-in by local citizens.

b. Enhance EPA's targeted watershed grants. EPA should enhance its targeted watershed grants program, which assists watershed organizations in building their capacity to be better positioned to undertake large projects. Many local watershed groups view the

goals of the grants as laudatory, but also believe that the funding (targeted at larger projects) was achieved by eliminating funding for smaller projects. NACEPT urges EPA to consider creating a "best of both worlds" opportunity by funding statewide groups that would integrate, through subcontracting, smaller local projects that in composite have watershed-wide effects commensurate with a large-scale project. Such an approach would provide project management efficiency at the state or tribal level while promoting broader participation by local groups.

c. Use supplemental environmental projects. Supplemental environmental projects (SEPs) are enforcement resolution tools that EPA can use to provide funding and resources (from the enforcement target) for environmental projects in communities. SEPs generally offer flexibility and funding and thus can be very helpful in providing seed money for watershed demonstration projects, such as watershed-wide water quality monitoring.

d. New regional watershed initiatives. EPA has already created several regional watershed initiatives, such as the Chesapeake Bay, Gulf of Mexico, and Great Lakes. EPA should explore creation of additional regional watershed initiatives to cover portions of the country that are currently not involved in such projects but possess unique geographic and ecological features that would benefit from such a concerted, integrated approach. One such possibility would be the Rocky Mountain Headwaters.

e. Smart growth grants. EPA's smart growth initiative in the Office of Policy, Economics, and Innovation works well with the Office of Water, states, tribes, local governments, and the real estate and development industry. As water supply decisions become more important to community development decisions, EPA should consider providing additional technical assistance and funding for the smart growth program.

23. Provide wastewater and drinking water state revolving funds to promote green infrastructure. EPA should work with its regional offices, tribes, and states to explore ways the Agency can use the SRF program to promote green infrastructure that offers watershed sustainability. We recommend that EPA consider a comprehensive natural systems or ecosystem approach to water-related green infrastructure because an ecosystem approach, involving both rural and urban components, can provide the most beneficial foundation for the future needs of the area. (See Appendix 10 for an example of this type of approach.) While states and tribes largely set environmental ranking criteria for SRF projects, EPA should develop explicit incentives in its SRF guidance for communities to use a watershed approach. EPA also might consider approaches to set aside a small amount of SRF dollars nationwide for competitive watershed-based green infrastructure planning (not construction) and should seek Congressional authorization for such set-asides where needed. The set-aside could target funds for integrated watershed management, including wastewater, stormwater, and combined sewer overflows, and require that all projects receiving SRF dollars be consistent with green infrastructure principles. To discourage sewer-expansion-driven sprawl, the SRF program could consider adopting a "fix it first" policy, whereby states would have to show preference for fixing existing water quality problems and failing infrastructure

before expanding sewers to accommodate new development in outlying areas. This concept, however, should not stand in the way of projects to provide necessary sewer services to existing areas that have been underserved or have not been served at all in the past. Some tribes and states already have developed policies in this area, and EPA should identify some successful examples and options as guidance for others. In addition, EPA should coordinate state activities with tribal programs that are supported by the SRF tribal set-aside.

24. Synchronize NPDES permit renewal dates across watersheds. EPA should continue working with states and tribes to synchronize all NPDES permit renewals within each watershed. This practical approach will allow a comprehensive, watershed-wide review of total NPDES loading, thereby promoting watershed-based pollutant trading and consistent application of effluent criteria. EPA should give states and tribes the option of conducting "administrative renewals" every five years and substantive renewals every ten years in order to focus more resources on priority watersheds. In addition, often overlooked and infrequently renewed "minor" NPDES permits should be included in the synchronized, watershed-based renewal schedule. Finally, other federal permits, such as Stormwater Phase II permits and underground injection control permits, should be included within such coordinated NPDES watershed renewal cycles. Where EPA has primacy in permitting, EPA should implement this timing approach.

25. Facilitate watershed trading. EPA should continue its work to make watershed trading easier. As one example, EPA could require that wastewater treatment plants meet end-of-pipe effluent limits within the typical timeframe for compliance, but allow more time to develop a watershed trading scheme that would result in equivalent (or greater) watershed benefits at lower cost. EPA should examine such trading incentives as: regional offices granting differential oversight to adequately performing tribal or state programs that wish to experiment with watershed trading; faster turnaround time for review/approval of state or tribal submissions (e.g., TMDLs, regulations, plans); and technical support from EPA regional offices.

26. Promote more innovative watershed-based TMDLs. Total maximum daily loads (TMDLs) are one of the clearest watershed-based tools EPA, tribes, and the states already have. NACEPT recommends that EPA take additional steps to promote innovative watershed-based TMDLs. NACEPT suggests, for example, that EPA adopt a shorter turn-around time for its regions to review TMDLs so that they would have more time to encourage and facilitate innovative TMDL approaches by states and tribes. NACEPT also applauds the Office of Policy, Economics and Innovation's pilot impervious cover method grants. To best use this powerful tool to facilitate watershed approaches to sustainable water infrastructure, EPA's TMDL program (and EPA's Office of General Counsel and the Office of Enforcement and Compliance Assurance) must take a broader view of its mission and embrace true watershed-based TMDLs. Given the opportunity to embrace greater overall environmental water gains, TMDLs could address all contributions (e.g., stormwater), not always be defined by water body segments, and not always be restricted to individual pollutant loads.

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar

**National Advisory Council for Environmental Policy and Technology**

**Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar**

### Background

The EPA Administrator has identified Sustainable Water Infrastructure (hereafter referred to as Sustainable Infrastructure (SI)) as one of the Agency's highest priority initiatives. In January 2003, the Administrator convened a Forum – *Closing the Gap: Innovative Responses for Sustainable Water*. At this Forum, the Assistant Administrator for Water highlighted the "Four Pillars of Sustainable Infrastructure"-- Better Management, Full-Cost Pricing, Water Efficiency, and Watershed Approaches to Protection (hereafter referred as the Watershed Pillar). The SI initiative aims to decrease the gap between growing infrastructure (drinking water plants, piping, etc.) needs and spending, by promoting sustainable infrastructure through the four Pillars.

This charge is being developed to address the challenges specific to the Sustainable Infrastructure (SI) Watershed Pillar. The goal of the Watershed Pillar is to enable utilities (i.e., drinking water and wastewater) and other stakeholders (e.g., local and State agencies, local planning and ordinance organizations, environmental advocacy groups, watershed decision makers) to take advantage of opportunities offered by watershed approaches to minimize infrastructure cost and/or operating and maintenance expenses to achieve water quality and quantity and human health protection goals.

One of the most critical challenges facing the Nation is how to sustain our water and wastewater infrastructure to ensure that the public can continue to enjoy the environmental, health, social, and economic benefits that clean and safe water provide.

Our wastewater and drinking water systems are aging, with some system components older than 100 years. Our growing and shifting population requires investment for new infrastructure and maintenance of existing infrastructure. Current treatment strategies and technologies may not be adequate to address emerging issues, investment in research and development has declined, and the prospects for continued large federal investment are limited.

EPA's *Clean Water and Drinking Water Infrastructure Gap Analysis* (2002) estimated that if capital investment and operations and maintenance remained at current levels, the potential gap in funding between 2000 and 2019 would be approximately $270 billion for wastewater infrastructure and $263 billion for drinking water infrastructure.

Meeting these challenges requires a multi-faceted approach to managing and sustaining our infrastructure assets. The Nation must change the way we manage, view, value, and invest in our water infrastructure. This can only come about if all parties embrace a collaborative approach

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

that encourages new and innovative solutions to the challenges we all face. All levels of government and the private sector have a shared responsibility for seeking effective, efficient, and fair solutions for sustaining our precious water infrastructure.

Through collaboration with all key stakeholders, the use of effective and innovative approaches and technologies, and a commitment to long-term stewardship of our water infrastructure, we can make better use of our resources, potentially reduce the funding gap and move the Nation's water infrastructure down a pathway toward sustainability over the next fifteen years. For example, more than 4,000 local watershed organizations are at work in the United States. They are advocating watershed restoration, source water protection, improved site design, erosion control, land conservation, and storm water management -- to name just a few activities.

The watershed approach is generally invoked to mean broad stakeholder involvement, hydrologically defined boundaries, and coordinated management across all aspects of policy that affect water. "Source water protection" is the watershed approach's analog under the Safe Drinking Water Act. The watershed approach and source water protection are grounded in science and allow for prioritization and cost-effective interventions, as appropriate.

The EPA Office of Water's 2003 guidance on watershed-based permitting and water quality trading allow for strategic, cost-effective actions to meet water quality standards. Watershed goals and the impact of multiple pollutant sources and stressors, including nonpoint sources, are considered when National Pollutant Discharge Elimination System (NPDES) permits are written for multiple sources in a watershed. The goal of this approach is to issue permits that take into account the conditions of the entire watershed and address diverse pollution sources, not just individual point sources. Often, such permits carry a trading component. A current example of a successful watershed-based permit with trading can be found along Long Island Sound, where nitrogen trading among dozens of publicly owned treatment works in Connecticut is expected to save more than $200 million in control costs.

Source water protection, targeted to protect current and future sources of drinking water, also holds the promise of substantial benefits. EPA has determined that preventing contamination can be up to 40 times more cost effective than remediation of a drinking water source or finding a new one.

Development decisions are another important approach to the watershed paradigm. Development decisions are generally made at the local level. While local governments have direct authority over land use and development decisions, many states play important roles in setting statewide approaches to planning for growth. The EPA cannot and should not be a national or regional development board, but the federal government can help states and municipalities better understand the impacts of development patterns. The Source Water Collaborative's[3] recent

[3] The *Source Water Collaborative* consists of a broad set of constituencies that include the U.S. EPA and 13 national premier organizations (representing state agencies, water utilities and environmental groups) that have agreed to combine their efforts to protect drinking water sources.

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

Vision Statement notes that drinking water protection should be integrated into land-use planning and stewardship; road, sewer and water projects; farming, industry and development practices; waste disposal methods; watershed planning, protection and clean-up; and the routine decisions Americans make every day. EPA is working to help states and communities realize the economic, community, and environmental benefits of smart growth by: 1) providing information, model programs, and analytical tools to inform communities about growth and development; 2) working to remove federal barriers that may hinder smarter community growth; and 3) creating new resources and incentives for states and communities pursuing smart growth.

A key objective the Agency wishes to advance under the sustainable infrastructure effort is the merger of watershed management principles into utility management, so that key decision makers consider the watershed approach alongside the traditional treatment technology investments. As part of this effort, the Agency needs information regarding whether: 1) a bias exists in favor of technological investments due to existing governmental policies, institutional structures, scientific uncertainties, or problems in valuing the benefits of using a watershed approach; and 2) if such a bias exists, how can this bias be eliminated?

The SI now seeks to develop more robust information, data, case studies, and lessons-learned with respect to the use of watershed approaches to avoid or reduce current or future infrastructure costs and/or operating and maintenance expenses. EPA is specifically interested in gathering data on the cost savings and ecological and public health benefits that the use of such an approach may accrue while still achieving compliance with the requirements of the Clean Water Act and Safe Drinking Water Act.

### Charge to the NACEPT Water Infrastructure Workgroup

The Water Infrastructure Workgroup of the National Advisory Council for Environmental Policy and Technology (NACEPT) is asked to assist the Agency in advancing cost-effective and sustainable approaches to water resource management and infrastructure to meet watershed goals. It is the Agency's position that the watershed approach is critical to protecting and restoring the nation's waters. The Agency furthermore suspects that in order for the benefits of the watershed approach to be fully realized it must be integrated into the comprehensive planning processes at the state, regional and local levels.

There are several areas where NACEPT can assist the Agency in determining how to best use its expertise and resources to promote the watershed approach, as it specifically applies to Sustainable Infrastructure, and its integration into state, regional and local comprehensive planning processes.

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

**Overall Goals:**

A. Promote the development of sustainable infrastructure by elevating water resource and infrastructure protection and management as a state, regional and local government priority in the comprehensive planning process on a par with transportation planning, public safety and schools.

B. Encourage widespread adoption of an integrated planning approach focused on water resource and infrastructure protection and management.

C. Provide information, data, tools and tools necessary for state and local governments and their communities to adopt these approaches.

**Research and Recommendations**

The Charge encompasses two distinct focus areas. Consequently, the Office of Water is proposing that NACEPT adopt a phased approach for addressing the charge over a two-year period.

A. Phase *1: Comprehensive Planning and Decision-Making*

No later than May, 2007 NACEPT would identify incentives, drivers, barriers, and other factors that encourage or inhibit the prioritization of water resource infrastructure and management into the comprehensive state, regional and municipal planning frameworks and decision-making processes.

Also no later than May, 2007 NACEPT would provide recommendations to the Agency on:

1. Actions the Agency can take to help states and local governments overcome the barriers and impediments that prevent the full integration of water resource management as a priority in their respective planning and decision-making processes. For example:

b. How can the Agency more effectively promote increased collaboration among drinking water, wastewater and storm water utilities, local governments, planning boards and other stakeholders that result in collective water infrastructure priority setting under a watershed management context through education and other means?

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

c. How can municipalities and other local government/regional planning entities build support for promoting a watershed approach to water infrastructure planning?

d. Using relevant examples from the recent Cooperation Conservation Conference, what are the ways in which "cooperative conservation" or "coordinated resource management" has been or can be used to overcome barriers to promoting a watershed approach to water infrastructure planning?

e. How can EPA, States, or others influence various community stakeholders to adopt and promote such an approach?

f. What are the specific barriers embodied in existing EPA and state policies or practices that need to be remedied to help EPA and states further encourage and assist entities to consider and implement alternative and integrated approaches for water infrastructure planning and management?

B. *Phase 2: Benefits of Traditional versus Alternative Approaches to Water Resource Infrastructure and Management*

No later than May, 2008 NACEPT would identify, analyze and report on the *actual or potential benefits* that accrue to local governments and utilities that use alternative and integrated approaches to manage wastewater, drinking water, and storm water, and the factors that affect whether alternative or traditional approaches are more cost-effective. Examples of these alternative approaches include centralized management of decentralized technologies and systems, soft path technologies, conservation designs, smart growth strategies, water conservation and reuse policies and low impact development approaches.

In doing so, NACEPT would examine specific examples and associated factors from communities where centralized approaches are predominant and those where alternative approaches have been used, along with the key factors that caused these communities to adopt these approaches.

In addition, NACEPT would identify, analyze and report on the *actual or potential incentives* for local governments and utilities to use alternative and integrated approaches to manage wastewater, drinking water, and storm water.

## APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

Also no later than May, 2008 NACEPT would provide recommendations to the Agency on:

1. Specific actions (e.g., policy, guidance, technical and programmatic tools, research) that the Agency can take to encourage and promote the investigation of alternative approaches that could meet water quality and service objectives at lower life-cycle cost than traditional approaches. For example, assist EPA in identifying mechanisms for promoting consideration of centralized management and oversight of decentralized systems as a cost-effective alternative to physical consolidation of infrastructure.

**Potential Future Work**

EPA would be open to identifying additional research areas, upon completion of the current charge, to further improve the understanding of sustainable infrastructure issues. The additional research topics may include new areas or may build upon the results of the current research charge.

APPENDIX 1: Charge for Developing Recommendations on U.S. EPA's Sustainable Infrastructure Watershed Pillar (*continued*)

## ATTACHMENT A

# Watershed Approach (Long Version)

**What does EPA mean by "a watershed approach"?**

To achieve environmental goals EPA encourages adoption of a watershed approach as a broad coordinating process for focusing on priority water resource problems. Using a watershed approach, multiple stakeholders integrate regional and locally-led activities with local, State, Tribal, and Federal environmental management programs. These environmental goals should ultimately protect and restore the health of the nation's aquatic resources, which includes but goes beyond meeting water quality standards; we must also address (a) pollutants for which there are currently not numeric standards (including nutrients and clean sediments); (b) healthy aquatic habitats (including wetlands); (c) coastal and marine waters; and (d) invasive species and other stressors. Relevant activities in watersheds include use of Clean Water Act and Safe Drinking Water Act authorities, funding and guidance, as well as many other tools that are available through other Federal, State, Tribal and local programs and non-governmental resources.

Major elements of successful watershed approaches involve:

- **focusing on hydrologically-defined areas**--watersheds and aquifers have hydrologic features that converge to a common point of flow; watersheds range in size from the very large, such as the Mississippi River Basin, to a drainage basin for a small creek;
- **using an integrated set of tools and programs** (regulatory and voluntary, Federal/State/Tribal/local and non-governmental sectors; innovation; communication and technical assistance; and sound science and information) to address the myriad problems facing our Nation's water resources, including: nonpoint source and point source pollution, habitat degradation, invasive species, and air deposition of pollutants, like mercury and nutrients;
- **involving all parties having a stake**, or interest, in developing collaborative solutions to a watershed's water resource problems;
- **using an iterative planning or adaptive management process** of assessment, setting environmental and water quality and habitat goals such as water quality standards, planning, implementation, and monitoring and ensuring that plans and implementation actions are revised to reflect new data.
- **breaking down barriers between plan development and implementation** to enhance prospects for success

EPA continues to work with Federal agencies, States, Tribes, local communities, and non-governmental sectors to make a watershed approach the key coordinating framework of our planning, restoration, and protection efforts to achieve "clean and safe" water and healthy aquatic habitat.

## APPENDIX 2: List of NACEPT Sustainable Water Infrastructure Work Group Members

**NACEPT Chair:**

John Howard
Vinson & Elkins, LLP

**Workgroup Chairs:**

Dan Watts (2007)
New Jersey Institute of Technology

Richard Sustich (2006)
University of Illinois at Urbana/Champaign

**Members:**

Arthur "Butch" Blazer
New Mexico State Forestry Division

Rob Buirgy
Big Thompson Watershed Forum

Jeff Crane
Colorado Watershed Assembly

Renu Khator
University of South Florida

Clayton Matt
Confederated Salish and Kootenai Tribes

Bill Mullican
Texas Water Development Board

Howard Neukrug
Philadelphia Water

Arleen O' Donnell
Massachusetts Department of Environmental Protection

Harrison Rue
Thomas Jefferson Planning District Commission & Charlottesville-Albemarle Metropolitan Planning Organization

Dan Williams
Architect

**EPA Liaisons:**

Andy Crossland
Sheila Frace
Robert Goo
Kevin McCormack
Benita Best Wong

**Designated Federal Officer:**

Sonia Altieri
U.S. Environmental Protection Agency
Office of Cooperative Environmental Management

## APPENDIX 3: Schuylkill Action Network Fact Sheet

# Schuylkill Action Network (SAN)

Fact Sheet | May 2004

www.schuylkillactionnetwork.org


### Contact

Lori Reynolds, EPA 215-814-5435

### What is the SAN?

The Schuylkill Action Network (SAN) was formed in March 2003 to focus on drinking water and water quality issues of the Schuylkill River Watershed. The watershed includes parts of 11 counties in southeastern Pennsylvania and covers approximately 2000 square miles. The Schuylkill River has 62 drinking water intakes, provides water for thermoelectric generation, and offers fishing and recreational opportunities. Members of this collaborative Network include US EPA, Pennsylvania Department of Environmental Protection, City of Philadelphia Water Department, Conservation Districts, local officials, state and federal agencies, watershed organizations, nongovernmental organizations and other essential stakeholders assisting with the crafting of local solutions. The purpose of the SAN is:

***To improve the water resources of the Schuylkill River watershed by working in partnership with state agencies, local watershed organizations, water suppliers, local governments, and the federal government to transcend regulatory and jurisdictional boundaries in the implementation of protection measures.***


### What are the Issues?

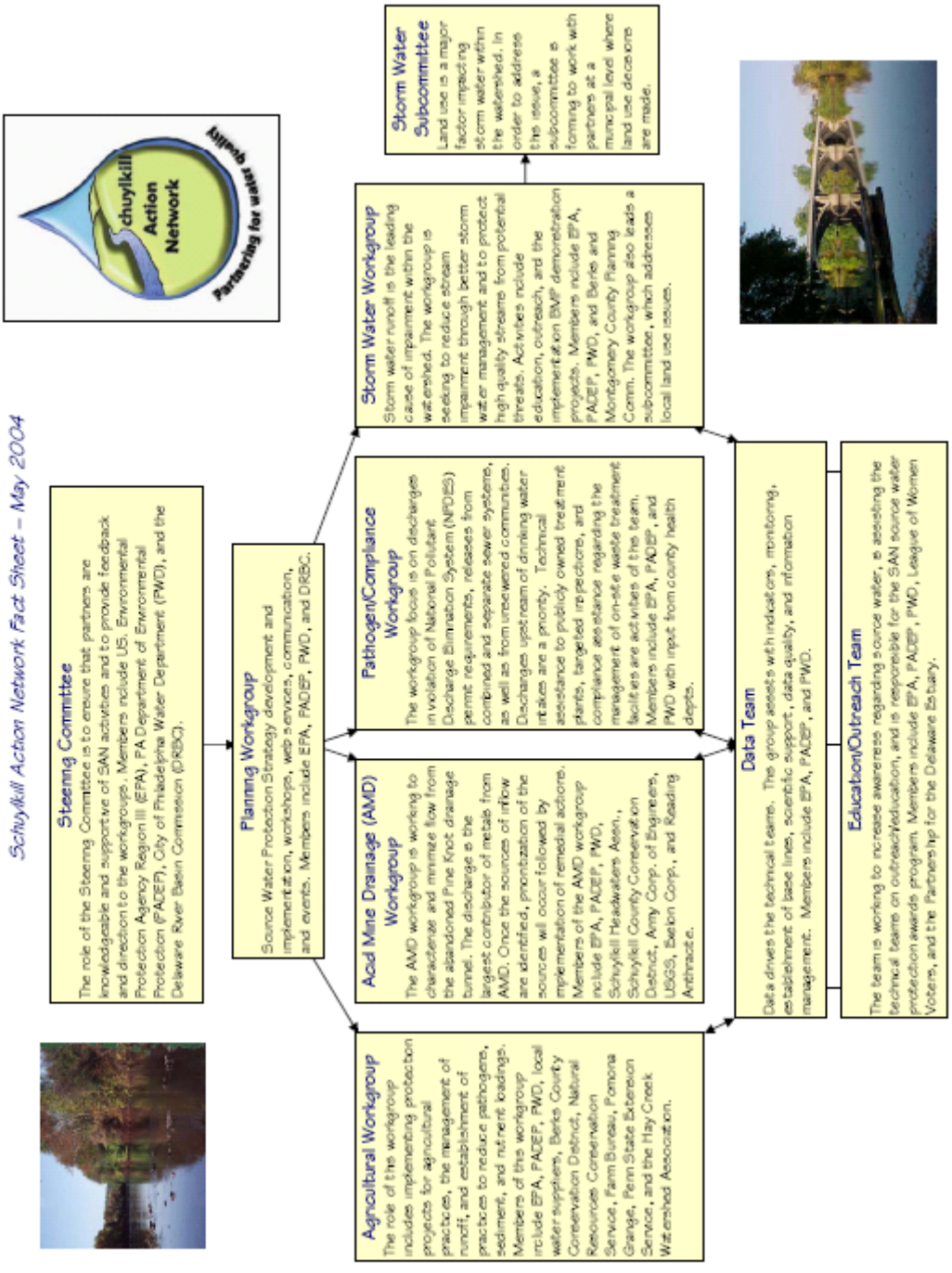
The Schuylkill River and its tributaries have long been recognized for the important role they play as a source of drinking water and fish habitat. The main stem of the Schuylkill became the first scenic river designated in Pennsylvania. Approximately one-quarter of the watershed is designated as high quality or exceptional waters. The Schuylkill River is the largest tributary to the Delaware River.

In the past 30 years, however, the health of the river and its tributaries has changed dramatically. While dissolved oxygen has increased and fish population rebounded, due largely to the Clean Water Act, a variety of land activities have degraded the streams in the watershed. Major contributors include inappropriate agricultural practices, storm water runoff, sewage overflows, PCBs, and acid mine drainage from abandoned mines.

These contaminants have triggered advisories on fish consumption, threaten the safety of potable drinking water supplies, and risk the health of the waters for recreational use.

The SAN includes a Steering Committee, a Planning Workgroup and Technical Workgroups to address the complex issues in the Schuylkill River watershed. SAN will restore and protect the watershed as a regional drinking water source; promote stewardship and education; transfer the experience and lessons learned to other communities; and enhance intergovernmental communication and collaboration.

## APPENDIX 3: Schuylkill Action Network Fact Sheet (*continued*)



## APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects"

***Federal Cooperative Agreement Opportunity***
***Request for Applications (RFA)***
***Executive Summary***

| | |
|---|---|
| Federal Agency Name: | U.S. Department of Transportation<br>Federal Highway Administration<br>Office of Acquisition Management<br>1200 New Jersey Avenue, SE, Room (TBD)<br>Mail Drop: W36-481<br>Washington, DC 20590<br>Attn: Sarah Berman, HAAM-40F |
| Funding Opportunity Title: | ***"Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects"*** |
| Announcement Type: | This is the formal announcement of this funding opportunity. It has previously been described on FHWA's STEP website at http://www.fhwa.dot.gov/hep/step/fy07rp.htm |
| Funding Opportunity Number: | ***RFA Number DTFH61-07-RA-00117*** |

### SECTION I - FUNDING OPPORTUNITY DESCRIPTION

A. STATEMENT OF PURPOSE

The Federal Highway Administration (FHWA) hereby requests applications to result in the award of up to ten (10) cooperative agreements for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects."

B. LEGISLATIVE AUTHORITY

Section 5207 of the ***Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),*** Public Law 109-59, authorizes "… a Surface Transportation Environment and Planning Cooperative Research Program (STEP). The program carried out under this section may include research (1) to develop more accurate models for evaluating transportation control measures and system designs that are appropriate for use by State and local governments (including metropolitan planning organizations) in designing implementation plans to meet Federal, State, and local environmental requirements; (2) to improve understanding of the factors that contribute to the demand for transportation; (3) to develop indicators of economic, social, and environmental performance of transportation systems to facilitate analysis of potential alternatives; (4) to meet additional priorities determined by the Secretary in the strategic planning process under section 508; and (5) to refine, through the conduct of workshops, symposia, and panels, and in consultation with stakeholders (including the

APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (*continued*)

Department of Energy, the Environmental Protection Agency, and other appropriate Federal and State agencies and associations) the scope and research emphases of the program."

The authority to award a cooperative agreement for this effort is found in SAFETEA-LU Section 5201, paragraph (c)(3) Cooperation, Grants, And Contract, which states, "The Secretary may carry out research, development, and technology transfer activities related to transportation… by making grants to, or entering into contracts and cooperative agreements with one or more of the following: the National Academy of Sciences, the American Association of State Highway and Transportation Officials, any Federal laboratory, Federal agency, State agency, authority, association, institution, for profit or nonprofit corporation, organization, foreign country, or any other person."

C. BACKGROUND

The concept of integrating both infrastructure and ecological planning efforts has been incorporated into the last three transportation bills. Most recently, Section 6001 of the ***Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),*** Public Law 109-59, specifically incorporates environmental planning factors into the statewide and metropolitan planning processes, and requires that transportation planning agencies consult, as appropriate, with natural resource planning and protection agencies to coordinate and compare their planning efforts and products. These efforts lead to more informed transportation planning decision-making, including the integration of natural resource considerations with transportation needs, prioritized mitigation areas, and the identification of mitigation opportunities having the greatest potential to restore the environmental functions that may be affected by a proposed transportation project. Section 6002 of SAFETEA-LU strengthens and carries these planning objectives forward into project development by requiring transportation agencies to coordinate with resource agencies and public stakeholders as early as possible in the Environmental Review Process.

In 2002, Executive Order 13274 *Environmental Stewardship and Transportation Infrastructure Project Reviews* was signed. The order was issued to promote environmental stewardship in the nation's transportation system and to streamline the environmental review and development of transportation infrastructure projects. An interagency task force was established to oversee the implementation of the Executive Order and monitor the environmental review of certain high priority projects. A workgroup was established by the task force to focus on creating and documenting better ways to more effectively link transportation system planning performed by State and local governments with natural and cultural resource concerns. While planning efforts are required at transportation agencies as well as resource conservation agencies, historically these efforts have occurred with little or no coordination between the agencies until the plans are implemented and specific projects initiated. In addition, the workgroup formed the core group that led to the creation of the publication *Eco-Logical: an Ecosystem Approach to Developing Infrastructure Projects, (Eco-Logical)* in early 2006. A PDF version of *Eco-Logical* is available at: http://www.environment.fhwa.dot.gov/ecological/eco_index.asp.

APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (*continued*)

The multi-agency publication *Eco-Logical* encourages Federal, State, tribal, and local partners to integrate environmental solutions and goals into planning for infrastructure development. *Eco-*

*Logical* puts forth the conceptual groundwork for integrating environmental and infrastructure plans across agency and geographical boundaries, and endorses ecosystem-based mitigation approaches to compensate for unavoidable impacts caused by infrastructure projects.

The ecosystem approach to infrastructure development as outlined in *Eco-Logical* consists of restoring, creating, enhancing, and preserving habitat and other ecosystem features in conjunction with or in advance of projects in areas where environmental needs and the potential environmental contributions have been determined to be greatest. Ecosystem-based mitigation extends existing compensatory mitigation options by offering a way to evaluate alternatives for off-site mitigation and/or out-of-kind mitigation in the ecologically most important areas as defined by interagency partners and the public. The approach shifts the Federal government's traditional focus from individual jurisdictions and actions to a larger focus of multiple agencies within the larger natural ecosystem. The overall goals of the ecosystem approach to mitigation and *Eco-Logical* are: conserve larger, scarce, multi-resource ecosystems; increase habitat connectivity; improve predictability in environmental review and regulatory processes; provide better public involvement to improve transparency and establish greater credibility; and streamline infrastructure planning and development.

Various habitat or watershed programs are cited in *Eco-Logical* as examples of components of an ecosystem approach to mitigation. Some of the examples focus on conservation of habitat for a single species, such as the Indiana Habitat Conservation Plan for the Indiana Bat and the Alabama Gopher tortoise conservation bank. Other initiatives, such as the Colorado Short grass Prairie Initiative and North Carolina's Ecosystem Enhancement Program, are more comprehensive in their conservation strategies.

D. OBJECTIVES

The objective of the "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" is to conduct an integrated planning effort and develop ecosystem-based approaches for transportation related efforts as outlined in *Eco-Logical*, which may be used as case studies and best practices to be promoted nationwide.

E. STATEMENT OF WORK

FHWA asks prospective applicants to focus on the *Eco-Logical* document as the primary construct in developing their proposal. The applicant's application shall address one or more elements suggested in the eight-step integrated planning process described in *Eco-Logical*.

*Eco-Logical* articulates a vision of how infrastructure development and ecosystem conservation can be integrated to harmonize economic, environmental, and social needs and objectives. The development of an ecosystem based approach will provide planning agencies, as well as

APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (*continued*)

communities and resource agencies, the ability to utilize the best available science and achieve greater efficiencies in the transportation decision-making process.

The ecosystem approach should be viewed as a tool for partners to develop acceptable solutions that complement agency missions. Agencies and private and public partners are encouraged to

build collaborative partnerships to establish an integrated planning method that would ultimately yield a Regional Ecosystem Framework (REF) that designates environmental priority areas, mitigation options, and performance measures for the mitigation effort. Some expected benefits from this approach can be: safer and improved infrastructure that balances social and ecological concerns, watershed and ecosystem health, and minimized habitat fragmentation as a result of planning focused on increased habitat connectivity and conservation.

Recipients shall perform tasks within the following work areas, which are based on the eight-step integrated planning process described in *Eco-Logical*:

1. Partnering and Data;
2. Integration of Conservation and Transportation Planning; and
3. Performance Monitoring

**Note: Applicants may propose to perform activities under one, two or three of the above work areas. Additional weight will be given to proposals that incorporate elements of multiple work areas.**

**Note: In addition to the three work areas noted above, applicants are encouraged to propose other activities that support the integration of natural resource planning and preservation with the development of transportation based plans and projects within the funding limitation on page 8 of this RFA.**

*Area 1. Partnering and Data*

This work area is based on the initial steps of the integrated planning process as described in *Eco-Logical*. Applicants applying under this work area may be at the early stages of developing an Eco-Logical framework for their transportation infrastructure program or individual projects. Partnerships are being developed and planning documents are being collected.

**Note: Applicants shall identify what their agency will accomplish with this project, identify where their agency is in institutionalizing the Eco-Logical framework, and indicate the next steps to be taken in the project.**

The Recipient shall engage in any or all of the following:

- Partnership building: convening multiple agencies and stakeholders

APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (*continued*)

        - For example, facilitated meetings/training; establishment of formal agreements such as memorandums of understanding/agreement
    - Data sharing: collecting and sharing existing plans and data among multiple agencies
    - Data gathering: collecting data and/or researching existing resources
        - For example, to be used in the development of a regional ecosystem framework (REF); GIS based maps of ecological areas and cultural resources

*Area 2. Integration of Conservation and Transportation Planning*

This work area is based on the middle steps of the integrated planning process as described in *Eco-Logical*. Applicants applying under this work area have already formed partnerships with multiple agencies, have collected planning documents from these agencies and are beginning to integrate these plans.

**Note: Applicants shall identify what their agency will accomplish with this project, identify where their agency is in institutionalizing the Eco-Logical framework, and indicate the next steps to be taken in the project.**

The Recipient shall engage in any or all of the following:

- Resource assessment: identifying the most critical conservation areas from an ecosystem perspective
- Conservation planning: determining strategies to conserve critical resources
    - For example, development of a conservation strategy for important habitat and/or resources that identifies actual opportunities for adaptive management and ecosystem enhancements
- Integrated planning: applying conservation data and assessments, goals and strategies into transportation planning
    - For example, the incorporation of environmental resource management plans and other data to be considered as part of the environmental analysis for transportation planning (multimodal, corridor), project planning, environmental analysis, design, maintenance, and operations
- Ecosystem mitigation: connecting ecosystem strategies to transportation projects and programs

*Area 3. Performance Monitoring*

This work area is based on the final steps of the integrated planning process as described in *Eco-Logical*. Applicants applying under this work area have already identified and prioritized mitigation areas based on proposed transportation infrastructure projects. This work area evaluates how well the Eco-Logical framework is implemented, the environmental health of the

APPENDIX 4: Portion of Federal Highway Administration Request for Applications for "Integrating Transportation and Resource Planning to Develop Ecosystem Based Infrastructure Projects" (*continued*)

ecosystem, environmental documentation and review timeliness, and the deliverability of transportation infrastructure projects.

**Note: Applicants shall identify what their agency will accomplish with this project, identify where their agency is in institutionalizing the Eco-Logical framework, and indicate the next steps to be taken in the project.**

The Recipient shall develop **at least one** of the following:

- Performance measures: defining metrics to be used to assess ecosystem health and stewardship

- Monitoring systems: developing programs for monitoring ecosystem health and stewardship
  - For example, the development of an adaptive measurement process to monitor the impacts of infrastructure plans and projects on the ecosystem
- Agency performance measures: development of guidelines to assist State/local transportation agencies and other groups to effectively and efficiently integrate planning efforts by implementing and attaining compliance with related rules/regulations, policies, and standards

## APPENDIX 5: EPA Region I Charles River Project Press Release

**Charles River 'Report Card' Grade Drops to a "B-" – Clean Up Efforts Continue; Outlying Communities Challenged to Match Boston and Cambridge's Efforts**

Contact: Peyton Fleming, EPA Press Office (617-918-1008)

For Immediate Release: April 21, 2004 Release # 04-04-39

BOSTON - The U.S. Environmental Protection Agency today announced a report card grade of "B-", down from a "B" last year, for the Charles River. The grade, based on water quality data collected last year, shows that water quality improvements in the river have leveled off in recent years and that additional stormwater controls and planned sewer system upgrades will be essential for water quality to improve over the next few years.

While environmental officials acknowledged the reduced grade indicates the huge challenge involved in restoring the Charles, they also pointed out that the goal of making the river safe for swimming and fishing is within reach. Future improvements will depend to a large extent on towns and cities along the Charles incorporating the kind of all-out effort already underway in both Boston and Cambridge. Those two cities are spending hundreds of millions of dollars tackling illicit sewer connections, stormwater overflows and other pollution problems that continue to beset the Charles River, especially after rain events.

"If every community along the Charles puts in the kind of effort to reduce sewer waste we have seen in Cambridge and Boston, we can indeed cross the finish line," said Robert W. Varney, regional administrator for EPA's New England Office, at a news conference today on the Weeks Footbridge overlooking the river. "The dramatic water quality improvements we achieved in the early stages of this project are still with us, and the Charles continues to be much cleaner and safer than it was in the mid-1990s. However, with each increment of progress, the task ahead becomes more challenging. We grabbed the low-hanging fruit in the late 1990s. Now we are reaching for the upper branches."

Over the last five years, communities have successfully closed illegal discharge pipes and separated sewer lines responsible for much of the river's pollution. More than one million gallons a day of sewerage was removed from the river through those efforts. But stormwater overflows and illegal sewer-line hookups continue to discharge more sewage than is acceptable.

"Today's grade clearly underscores the complexities of resolving issues in the urban environment," said Robert Zimmerman, executive director of the Charles River Watershed Association, which collects the water quality samples used for grading the river. "Nevertheless, with attention and diligence, and some creativity, the Charles can be fully restored. I'm looking forward to redoubling our efforts over the coming years."

Last year, the river was clean enough for boating 85 percent of the time, down from 91 percent of the time in 2002 and met swimming standards 46 percent of the time, compared to 51 percent the previous year.

## APPENDIX 5: EPA Region I Charles River Project Press Release (*continued*)

Although the 2003 data shows that challenges that lie ahead, dramatic gains have been made since the Clean Charles 2005 initiative began in 1995. At that time, EPA gave the Charles a

grade of "D," since it was meeting bacteria boating standards only 39 percent of the time and swimming standards only 19 percent.

During that time, significant efforts by state and local agencies, businesses and individuals have successfully reduced stormwater discharges, illicit sewer connections and other pollution sources.

Various actions were outlined today for achieving additional water quality improvements in the river, among those:

- Boston Projects: Boston, with support from the MWRA, is spending millions of dollars to reduce combined sewer overflows into the river from the Stony Brook drainage basin, which includes Jamaica Plain, Hyde Park, Roslindale and West Roxbury. When this project is done in 2006, Boston will have removed the largest remaining source of bacterial pollution to the Lower Basin. Boston has also undertaken a $1.5 million project to identify illicit sewer connections in this drainage basin. Illicit connections are also being removed in Fanueil Brook, another significant source of bacteria into the river. This project is part of a new City-Wide Illicit Connection Investigation Program that Boston is undertaking. The three-year program will address an estimated 6,000 acres throughout the city served by separate storm drains. The investigation will focus on approximately 95 outfalls, 2,500 manholes and 6,000 building connections. Collectively, Boston's programs removed nearly three-dozen illicit connections last year that were discharging 12,000 gallons of sewage a day into the river.

- Cambridge Projects: Since the mid-1990s, Cambridge has spent more than $100 million on sewer separation and stormwater management activities. Over the next several years, Cambridge has earmarked more than $70 million for additional sewer reconstruction projects. Among the biggest projects is separating storm drains from sewer pipes in the city's Agassiz neighborhood, a project that will result in far fewer discharges from the Cottage Farm Combined Sewer facility, the largest discharge source on the Cambridge side of the river. Another significant project is a $30 million effort to eliminate 90 million gallons of combined sewerage that presently flows into the Charles from the Cambridgeport neighborhood during heavy rains.

- Watershed-Wide Stormwater Management Subcommittee: Boston and Cambridge have agreed to lead an EPA-sponsored subcommittee, created as part of the Clean Charles 2005 Task Force, to make sure that all municipalities in the watershed are doing all that they can to reduce stormwater pollution into the river. Based on the significant knowledge and technical expertise of these two cities, their experience will be a tremendous asset to other municipalities to identify and correct inappropriate discharges into the river. Among the top priorities is the development of a comprehensive, systematic illicit connection identification and elimination protocol similar to the program being used by Boston. EPA intends to make comprehensive illicit removal

## APPENDIX 5: EPA Region I Charles River Project Press Release (*continued*)

- programs a requirement of each municipality=s stormwater management permits. EPA will monitor through annual reports the progress these communities are making toward eliminating all connections.

- Hot spot monitoring: Citizen watchdog Roger Frymire of Cambridge has helped identify bacterial loads to the river, which have allowed EPA to direct municipalities, including Waltham, Boston, Watertown and Brookline, to give immediate attention to these discharges. In the year ahead, EPA will continue to look for such hot spots with Frymire's help.

For more information about EPA's Clean Charles 2005 project, visit EPA's web site at http://www.epa.gov/region01/charles/index.html.

APPENDIX 6: Nitrogen Trading by Connecticut POTWs

# Connecticut Pre-proposal to the United States Environmental Protection Agency

**Innovations Grant Program**
**August 19, 2002**

**Submitted by**
Connecticut Department of Environmental Protection
Bureau of Water Management
79 Elm Street
Hartford, CT 06106-5127

## Monitoring of Municipal Sewage Treatment Plants For Pollutant Credit Exchange and Compliance

**Summary**
The Connecticut Department of Environmental Protection (DEP) is implementing legislation authorizing the issuance of a watershed general permit to regulate the discharge of nitrogen from municipal point sources and the institution of a nitrogen credit-trading program pursuant to the approved Total Maximum Daily Load (TMDL) for Long Island Sound. The General Permit (GP) issued by DEP regulates 79 publicly-owned wastewater treatment works (POTW) located throughout the state of Connecticut and establishes the most expansive program of water pollutant trading in the U.S. This program is projected to save the state $200 million in capital construction costs and will accelerate the schedule for meeting the TMDL wasteload allocation (WLA) for point sources by providing economic incentives for those POTWs that move quickly to remove nitrogen and comply with the limits in the GP. There is potential to expand this approach within Connecticut to other sources, including nonpoint sources. It can also serve as a model for other states that are facing similar TMDL implementation challenges not only as a cost-effective approach to reducing a pollutant from numerous sources, but also as an innovative approach to integrating the allocation of State Revolving Fund funding with permitting and enforcement programs.

Despite the anticipated value and cost savings from implementing the Nitrogen Credit Exchange (NCE) in Connecticut, there are concerns over the reliability and accuracy of standard monitoring protocols. The GP sets monitoring frequency based on plant size. Facilities with design flows greater than or equal to 10 MGD are required to monitor the final effluent at a minimum frequency of twice per week while smaller plants are required to monitor at a minimum of once per week. Each sample must be a 24-h composite sample and be analyzed according to methods approved by EPA. While it is believed that this frequency will be adequate to characterize an individual plant's nitrogen load and that analytical protocols are proven suitable for wastewater analysis, local plant variability and weather effects may produce enough statistical error to require additional analyses. There have been no detailed studies of effluent nitrogen variability on daily to weekly time scales at Connecticut facilities. Given the economic impact of the nitrogen trading program at municipal and state levels, DEP needs to provide assurance that monitoring to generate credits is reasonably accurate and conducted at the most cost-effective frequency possible. Further, this evaluation will assist scheduling of compliance

APPENDIX 6: Nitrogen Trading by Connecticut POTWs (*continued*)

checks and reduce the possibility that nitrogen loads to Long Island Sound are erroneously under reported.

**Background**

Over the past decade, DEP has worked with the EPA Long Island Sound Study (LISS) and the Water Environment Research Foundation (WERF) to develop a framework for a Nitrogen Credit Trading Program. Connecticut and New York jointly drafted the TMDL to address seasonal low oxygen problems in Long Island Sound and with its approval in early 2001, Connecticut is faced with reducing nitrogen loads from 79 POTWs scattered throughout the state. Nitrogen is the primary pollutant linked to an extensive low-oxygen (hypoxia) problem that affects up to half of Long Island Sound's 1300 square miles of bottom during periods of summer stratification when bottom waters are prevented from mixing with surface waters. The nitrogen fuels the growth of algae, which eventually decays after it settles to the bottom of the Sound. The Sound is so heavily enriched that the microbial decay drives oxygen to levels low enough to create unhealthy or even lethal conditions for aquatic life.

The TMDL[1] to correct this problem, which was approved by the EPA in April 2001, requires a 58.5% reduction in baseline anthropogenic nitrogen loads from sources in Connecticut and New York by the year 2014. Using the trading framework developed by the LISS and WERF[2] as a starting point, DEP proposed legislation[3] to establish a nitrogen general permit and a nitrogen credit-trading program for municipal point sources throughout Connecticut. Public Act 01-180 was passed in June 2001 and established a Nitrogen Credit Exchange (NCE) to be guided by a Nitrogen Credit Advisory Board (NCAB) under the authority of the Commissioner of the DEP.

The Nitrogen General Permit is key to the success of Connecticut's trading program. It collectively regulates 79 POTWs located throughout the state and establishes the basis for the most expansive program of water pollutant trading in the U.S. The GP sets annual nitrogen limits for each POTW that are increasingly stringent until the final WLA is attained in 2014. POTWs can comply by either treating or by purchasing credits from the Nitrogen Credit Exchange annually. The nitrogen credit-trading program is both innovative and essential to resolve the complex water quality problems in Long Island Sound in a cost-effective manner. The proposed program links together Connecticut's existing general permitting authorities, the State Revolving Loan Program (SRF) and other salient features of state and federal laws to form a comprehensive regulatory program to assure compliance with Connecticut's nitrogen reduction requirements under the TMDL. However, the success or failure of this program, and the improvement to the health of LIS, rely heavily on our ability to accurately monitor nitrogen loads from the 79 facilities incorporated in the GP.

**TASK 1**

The first task under this proposal would be to conduct high-intensity monitoring at four to six municipal POTWs representing a range of sizes, nitrogen removal capability, and susceptibility to weather changes (e.g., infiltration from wet conditions). Samples would be collected at the facilities by automatic sampler for later analysis. One larger facility would be selected to utilize online real-time nitrogen analysis systems. The real-time analysis system will be installed and operated for a period of one year. The facility utilizing the online real real-time system would also conduct the same high-intensity monitoring. Laboratory analyses would be conducted using

## APPENDIX 6: Nitrogen Trading by Connecticut POTWs (*continued*)

EPA standard protocols under an approved EPA Quality Assurance Project Plan (QAPP). Frequency would be at least four times per day over a two-week period once during each of four seasons. This sampling strategy would experience a full range of wet/dry and warm/cool conditions that might affect nitrogen removal capability, and would also fully examine day to day fluctuations in effluent nitrogen strength.

Data would be analyzed statistically to identify and develop a sampling scheme that would maximize precision in monthly nitrogen load calculations. It is possible that certain conditions might need to be targeted for more frequent sampling, such as higher spring flows that might vary with rainfall, or certain days of the week that might reflect maximum or minimum concentrations related to business days vs. weekend conditions. The data could also help guide compliance monitoring programs to ensure reliable, yet cost-effective checks on self-monitoring programs. In both cases, it is the desire of DEP to gain the most reliable nitrogen load estimations with the minimum resources, saving money for the municipalities and DEP while not compromising the credibility of the NCE.

**TASK 2**
In addition to the first year's assessment of monitoring, DEP proposes to evaluate the program's effectiveness in regulating point source discharges as related to the accuracy of nitrogen load estimates. Because the first year of operation of the NCE (2002) will be based on the requirements of the GP noted above, this monitoring study will allow estimates of error under GP protocols compared to proposed revisions in the monitoring program that the study might support. Since one possibility is that the GP monitoring requirements are excessive, it will also be possible to demonstrate what significance there might be to an increase in sampling error under a reduced sampling schedule. Any number of "what if" scenarios can be constructed using the database generated in this study, allowing an optimal monitoring program to be selected from a range of potential error conditions.

**TASK 3**
The third task would seek to maximize efficiency of quality assurance for individual facility monitoring programs (e.g., duplicates, blanks) and frequency of independent (e.g., DEP) split sampling or compliance sampling. This analysis of the data would focus on error in split and duplicate samples, perhaps using two labs for some of the analyses, to ascertain level of reliability at the facility level and increase value of compliance sampling at the state level. An attempt will also be made to identify attributes associated with unreliable data or operational problems leading to development of a "risk-based" compliance/technical assistance program.

**Broader Application**
Connecticut has embarked on a complex, but highly innovative, general permitting and trading program that has not been implemented to this degree anywhere else in the U.S. Of prime consideration in evaluating the success of the point source program being implemented in 2002 and the potential for change in sampling frequency and timing, including compliance sampling without compromising nitrogen load estimation accuracy. In addition is the learning value it may hold for other states implementing complex TMDLs that require accurate reporting of pollutant loads. Estuaries like the Chesapeake Bay and Gulf of Mexico are addressing hypoxia problems similar to those observed in Long Island Sound and are planning and implementing nutrient

APPENDIX 6: Nitrogen Trading by Connecticut POTWs (*continued*)

control programs in multi-state areas. The successes and failures of Connecticut's program will yield valuable lessons for these and other areas where closed system trading under a general permit makes economic and environmental sense and the credibility of the program relies on accurate monitoring of effluent parameters.

**Deliverables**
Final products of this project will include:

1. A technical assessment of the intensive monitoring effort along with a comparative analysis of utilization of online real-time nitrogen analysis. (Task 1)
2. An evaluation of the change in error related to a range of monitoring schedules (Task 2)
3. An evaluation of quality assurance sampling and compliance sampling (Task 3)

***Budget (estimated for a two-year study effort)*** [REDACTED BY US EPA]

**References**


- New York State Department of Environmental Conservation and Connecticut Department of Environmental Protection. 2000. A total maximum daily load analysis to achieve water quality standards for dissolved oxygen in Long Island Sound. NYSDEC and CTDEP, 57 p.
- Water Environment Research Foundation. 1999. Nitrogen credit trading for Long Island Sound watershed. R.E. Moore, M.S. Overton, R.J. Norwood and D. DeRose, PIs. WERF Final Report RFP 97-IRM-5.
- Substitute Senate Bill No. 1012. 2001. An act concerning nitrogen reduction in Long Island Sound, Public Act No. 01-180. Connecticut General Assembly.
- General Permit for Nitrogen Discharges

## APPENDIX 7: California Regional Blueprint Planning Program (http://calblueprint.dot.ca.gov)

**California Regional Blueprint Planning Program**

The Regional Blueprint Planning Program is intended to better inform regional and local decision-making, through pro-active engagement of all segments of the population as well as critical stakeholders in the community, business interests, academia, builders, environmental advocates, and to foster consensus on a vision and preferred land use pattern. It is anticipated that the regional blueprint planning grants will build capacity for regional collaboration and integrated planning that will in turn enable regions to plan to accommodate all their future growth, thereby reducing need for sprawl.

The grants for regional collaborative decision-making will lead to adoption of blueprint plans that will:

1. Foster a more efficient land use pattern that (a) supports improved mobility and reduced dependency on single-occupant vehicle trips, (b) accommodates an adequate supply of housing for all incomes, (c) reduces impacts on valuable habitat, productive farmland, and air quality, (d) increases resource use efficiency, and (e) results in safe and vibrant neighborhoods.

2. Provide consumers more housing and transportation choices.

3. Improve California's economic competitiveness and quality of life.

4. Reduce costs and time needed to deliver transportation projects through informed early public and resource agency involvement.

5. Secure local government and community support, including that of under-represented groups, to achieve the resulting comprehensive vision through including innovative computer models and public involvement activities.

6. Establish a process for public and stakeholder engagement that can be replicated to build awareness of and support for critical infrastructure and housing needs.

The regional blueprint efforts will include development of regional performance measures that can measure progress toward the region's own vision for future land use and transportation. Each region will also select several statewide performance measures to measure progress toward statewide transportation system and housing goals.

## APPENDIX 8: Envision Utah (http://www.envisionutah.org)

### Introduction to Envision Utah

By the year 2020, the Greater Wasatch Area of Utah will add a million more residents, two-thirds of whom will be our own children and grandchildren. From Brigham City to Nephi and Kamas to Grantsville, Utah, residents breathe the same air, share common water sources and use the same roads as we drive to work, shopping and recreation. Just as Utah's founders planned for the future of our valley, we must work together today to preserve the quality of life in our growing communities.

In January 1997, the Envision Utah Public/Private Partnership was formed to guide the development of a broadly and publicly supported Quality Growth Strategy - a vision to protect Utah's environment, economic strength, and quality of life for generations to come. Five years of scenarios analysis, research and public involvement have helped Envision Utah bring the topic of planning and preparing for growth to the forefront of the public mind. With the help of thousands of Utah residents, Envision Utah has developed a Quality Growth Strategy that will help preserve critical lands, promote water conservation and clean air, improve our region-wide transportation systems, and provide housing options for all residents.

Envision Utah's goal throughout the process has been to involve key decision-makers and the community to gain support at the ground level. Building grass roots support for the project will ensure successful implementation. The Envision Utah effort has included research concerning core values of Utah residents, workshops with key stakeholders to address where and how to grow, and extensive public awareness and education efforts asking Utah residents to express their preferences for their communities' future. The Governor's Office of Planning and Budget coordinates a technical committee, Quality Growth Efficiency Tools (QGET), which provided critical technical information to help analyze the impacts of growth on transportation, air quality, land use, water supply/demand, and infrastructure costs. Through the exhaustive involvement of the public, local and state elected officials, the business, civic, and religious communities, and other key stakeholders, Envision Utah has gathered information about what Greater Wasatch Area residents value and how they think growth should be accommodated. Based on this information, Envision Utah identified six primary goals that need to be addressed in the Greater Wasatch Area if we are to protect our environment and maintain our economic vitality and quality of life as we accommodate anticipated growth:

- enhance air quality;
- increase mobility and transportation choices;
- preserve critical lands, including agricultural, sensitive and strategic open lands;
- conserve and maintain availability of water resources;
- provide housing opportunities for a range of family and income types; and
- maximize efficiency in public and infrastructure investments to promote other goals.

These goals can be realized over time by the careful and deliberate pursuit of the thirty-two individual strategies identified by Envision Utah in the Quality Growth Strategy. These strategies rely on citizen involvement with local officials, local land-use decision making and more awareness of free market needs in housing choices. Cooperation at the regional level, state incentives to local governments and local government incentives to developers will also be

necessary to address issues such as air quality, water conservation, housing opportunities, transportation, and critical lands.

APPENDIX 9: Jefferson Area Eastern Planning Initiative
(http://www.tjpdc.org/community/epi.asp)

# Jefferson Area Eastern Planning Initiative

***Building Livable Communities***

The small city and rural areas that make up the Charlottesville, Virginia region are growing rapidly. While growth stimulates new economic and cultural resources, many are concerned that the natural beauty of the Blue Ridge Mountains and the historical ambience of Monticello are being encroached upon by strip commercial development and dispersed subdivisions. These concerns prompted the Sustainability Council of the Thomas Jefferson Planning District Commission (TJPDC) to develop the broadly supported 1998 "Sustainability Accords".

In January 2000 the TJPDC launched the Jefferson Area Eastern Planning Initiative (EPI) with a grant from the Federal Highways Administration (FHWA) Transportation & Community & System Preservation (TCSP) Program. The EPI Advisory Committee, made up of elected officials, residents, and leaders from business, development, environmental and community groups, met eleven times and hosted four public workshops during the two-year study, focusing on three key questions:

- How will we live? - In what types of communities do we want to live and work by the year 2050?
- Where will we live? - What areas in the region are suitable for urban development and what areas are off limits?
- How will we get there? - What steps are needed to move the region from where it is now to the desired types of communities and growth patterns?

**How will we live?**

**Community Elements**

How can community design improve everyday quality of life? The project team developed drawings and spreadsheets describing the physical characteristics of 17 existing community types or "elements" throughout the region, from Charlottesville neighborhoods to small towns like Stanardsville and Palmyra. Each element was scaled to a 12 mile circle, about a 5-minute walk from edge to center, which made it easy for participants to visualize and compare them. Residents evaluated the community elements based on personal perspectives and the regional Sustainability Accords. The team then developed enhanced urban and suburban community elements, showing how more compact growth could occur over time.

**Designing Desirable Communities**

These design principles were developed by observing our region's historic communities, and can be applied to downtown neighborhoods, growing suburbs, or rural small towns.

## APPENDIX 9: Jefferson Area Eastern Planning Initiative (*continued*)

- Create a focal point that establishes community identify
- Provide a variety of activities to encourage interactions and improve convenience
- Design buildings and distances at a pedestrian scale
- Provide options to walk, bike, drive, and use transit
- Make open spaces accessible and available

The Urban Mixed Use design combines a healthy mix of housing, workplaces, shopping, culture and recreation within a 5-minute walk.

NOTE: The EPI is called "The Eastern Planning Initiative" because our funding required us to study the faster-growing, or Eastern, portions of the five-county region. Although not part of the original study, Nelson County has recently adopted a new Comprehensive Plan based on the EPI principles.

**Where will we live?**

**Regional Growth Scenarios**

Through games developed by the project team, residents created maps of possible future development patterns by clustering community elements. Using the CorPlan model, the team converted the maps into three scenarios that compared impacts on transportation, land consumption, and other factors from the Sustainability Accords. The reaction from the public at the workshops was clear: residents rejected a dispersed, low-density pattern, and preferred clustered enhanced communities along major corridors and key crossroads.

| How the Scenarios Compare | | | |
|---|---|---|---|
| | Dispersed | Town Centers | Urban Core |
| Percent Farms & Forests | 55% | 64% | 65% |
| Percent Developed | 45 | 36 | 35 |
| Percent Living in Clustered Communities | 13 | 61 | 68 |
| Percent Non-Auto Trips | 4 | 15 | 18 |
| Annual Gallons Gas Consumed (billions) | 155 | 121 | 110 |
| Percent Travel Congested | 44 | 27 | 20 |
| Water Quality & Quantity | Poor | Good | Good |

The Dispersed Scenario shows what can happen by the year 2050 if recent development trends continue. Suburban communities will continue to spread north along US 29 and east along US 250. A large network of wider roads and bypasses costing about $1 billion will be needed, and transit will not be feasible outside the core city. The Town Centers and Urban Core scenarios, by contrast, feature urban and enhanced suburban community elements as the building blocks for development. Growth would be concentrated in and around Charlottesville, with varying options for growth at major crossroads (Town Centers) or around existing villages and towns (Urban CoreL and CoreM).

The transportation system for the alternative scenarios is based upon a pedestrian-friendly street network in the development areas and allows for extensive expansion of the transit system,

including rail or bus rapid transit if the community wishes. Large freeways around the city would not be necessary. The street system would cost about $500 million, half as much as the network required by the Dispersed Scenario. The table below shows some real differences in the scenarios. While all would accommodate the same anticipated growth of people and jobs, the alternative scenarios would consume much less land and reduce overall roadway congestion significantly.

**How will we get there?**

**Building Success**

The Advisory Committee and the public agree that business as usual is not a preferred course. They also agree that changing course could be quite a challenge. They asked questions such as: Is it possible to build walkable communities in our auto-oriented society? Is it possible to cluster communities in areas where growth makes sense? Is it possible to change the way roads are planned and built? Is it possible for all localities to agree on a coordinated approach? What happens if not everyone buys into this new approach?

To address these challenges, the Advisory Committee recommends that the localities in the region work together to achieve the keys to success listed to the right. Some have already been initiated or are under consideration. Albemarle County has defined designated development areas in its comprehensive plan and recently incorporated the Neighborhood Model, a blueprint for livable communities, into its plan. Fluvanna County is updating its zoning ordinance; Nelson County is incorporating community elements into its comprehensive plan and zoning ordinance. Charlottesville recently completed a Commercial Corridor Study to promote livable communities and is rewriting its zoning code, and Greene County is now embarking upon a comprehensive plan update. TJPDC just completed a Regional Economic Development Plan and is developing the UnJAM 2025 transportation plan that meshes the MPO's goals for the urban area with new visions for the rural areas.

The Advisory Committee lauds the region's localities for all their efforts to work toward a sustainable future and presents this study as an important resource in taking another important step forward.

#### Dispelling the Myths

**Myth 1 - We Can Build Our Way Out Of Congestion**

Building new freeways and widening roads encourages development to spread, making trips longer and causing growth in overall vehicle miles traveled. The net result is more congestion. The EPI found that the number of congested miles driven under the Dispersed Scenario is nearly twice that of the Town Centers and Urban Core Scenarios despite adding twice the number of roadway lane miles.

APPENDIX 9: Jefferson Area Eastern Planning Initiative (*continued*)

**Myth 2 - Density Causes Congestion**

It is logical to think that more density leads to more congestion. But combining local trips into well designed compact development areas actually reduces congestion for two reasons: 1) typical trips are shorter, resulting in fewer vehicle miles driven, and 2) people can choose to walk, bicycle or take transit at least some of the time. The EPI analysis confirms this. The more compact Town Centers and Urban Core Scenarios result in half the congestion of the Dispersed Scenario with far fewer road investments.

**Myth 3 - Density Is Unattractive And Not Marketable**

The EPI scenarios, in response to strong preferences expressed by local residents, don't call for any new or existing communities to exceed the density of downtown Charlottesville (buildings up to four stories high and five or fewer single family homes per acre). The urban and enhanced suburban communities are able to accommodate more people and jobs by organizing streets, parking, public spaces and buildings more efficiently so suburban places can gradually fill in with attractive, livable amenities. It is primarily the proximity and improved connectivity of the enhanced elements that allows more people to live and work in them, not always bigger buildings or smaller yards. Nationally, these types of community designs are faring quite well in the marketplace.

**Myth 4 - Controlling Growth Causes Housing Prices To Increase**

Limiting the amount of developable land would raise housing prices if demand exceeded supply. But all of the EPI regional scenarios allow enough land for the anticipated growth. The amount of land needed for new development under the Dispersed scenario is twice what is needed for the other scenarios because virtually all new development would spread into suburbs and rural areas. The alternative scenarios assume that new development would be focused in urban centers, enhanced suburban communities, small towns and villages. These mixed-used community clusters naturally feature a variety of housing types and prices, just as they do today in downtown Charlottesville and the village of Palmyra. Localities can further boost a variety of housing in targeted areas through incentives such as location efficient mortgage programs and regulations such as inclusive zoning.

**Myth 5 - Everywhere Will Look Like Downtown Charlottesville**

Participants at EPI workshops and the Advisory Committee agreed that a wide variety of community types and land uses were desirable. The key to improving future development is to make enhancements to several community types, especially in suburban areas, such as giving them focal points and making them walkable. The alternative scenarios feature a variety of community types including urban, enhanced suburban, and traditional suburban areas as well as small towns and villages. Many people will also choose to live in rural areas, but the convenience and attractiveness of the targeted development centers will help localities target most new growth to community centers and preserve open spaces rather than having no choice but to spread out into farm and forestland.

APPENDIX 10: Greenseams Program – Milwaukee Metropolitan Sewerage District (http://www.mmsd.com/floodmanagement/greenseams.cfm)

## Greenseams

Land is the one thing we cannot make more of and MMSD is working hard to preserve what is needed to help prevent future flooding in the region. Greenseams is an innovative flood management program that permanently protects key lands containing water absorbing soils. The program also aims to preserve land along stream corridors that connects the region's supply of public properties.

**Figure 1: Forest**

By storing and draining water into the ground naturally, Greenseams provides added support and protection for MMSD's structural flood management projects - infrastructure investments worth hundreds of millions of dollars.

Greenseams identifies and purchases undeveloped, privately owned properties in areas that are expected to have major growth in the next 20 years and parcels of open space along streams, shorelines and wetlands. Sales are completely voluntary.

MMSD hired The Conservation Fund (TCF) to run Greenseams. TCF is a national non-profit conservation organization that forges partnerships to protect America's legacy of land and water resources. TCF performs high volume real estate transactions for local land trusts and government agencies throughout the country.

Black-eyed Susans on Hanson property

All land acquired will remain as open space, protecting water and providing the ability to naturally store rain and melting snow in critical areas. Wetlands maintenance and restoration at these sites will provide further water storage.

In addition, preserving the properties also saves wildlife habitat and creates recreational opportunities for people living in the region. Where applicable, the properties can be used by the public for hiking trails, bird watching, and other passive recreation.

**Partnerships**

One of the great benefits of Greenseams is the formation of key partnerships throughout the Milwaukee region. Each property acquired will be owned and managed by a local community or land trust and subject to a conservation easement held by MMSD. Conservation

APPENDIX 10: Greenseams Program – Milwaukee Metropolitan Sewerage District (*continued*)

easements ensure that the land remains open space forever.

A number of grant programs are used to leverage MMSD funds for Greenseams. In 2004, the United States Fish and Wildlife Service's Partners for Wildlife program contributed $7,900 and in-kind services towards restoration of three Greenseams properties. Also, MMSD and 5 other partners secured a North American Wetlands Conservation Act (NAWCA) grant, which provided Greenseams $130,000 to use for land purchases in 2005. In addition, the Wisconsin Department of Natural Resources Stewardship Program and the Wisconsin Coastal Management Program have recently contributed $575,417 and $147,400 respectively to help fund the purchase of Greenseams properties.

**Spreading the word about the program**
The Greenseams program is a unique approach to flood management and is touted as model land use technique at various forums, conferences and in other municipalities.

*Recent publicity has included:*

Wisconsin Chapter of American Planning Association Annual Conference
University of Wisconsin- Milwaukee
Land Trust Alliance
City of Ann Arbor
Civil Engineering News
Izaak Walton League
National Association of Counties
Wisconsin Association of Floodplain Managers